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COMMERCIAL FISHERIES REVIEW



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April 1947

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ARRIVALS OF FISHERY PRODUCTS AT SEATTLE, 1946

By E. C. Hinsdale*

Arrivals of fresh and frozen fish, shellfish, livers, and viscera at Seattle, including local landings and wholesale receipts from southern areas, coastwise vessel arrivals from Alaska, and imports from British Columbia and other Canadian maritime provinces, during 1946, totaled 77,385,000 pounds. This was a decline of 14 percent from the 1945 total receipts of 89,551,000 pounds.

The waters of Washington and Oregon again were the principal sources of supply. Together with Idaho, they accounted for 56,530,000 pounds, or 73 percent of all receipts. Alaska supplied 15,006,000 pounds, or 19 percent, and British Columbia, 5,547,000 pounds, or 7 percent. The Gulf States, California, and other sources (Table 1) contributed less than one-half of one percent.

Table 1 - Receipts by Source - 1946

Source	F R E S H			F R O Z E N		
	1946	1945	Change from 1945	1946	1945	Change from 1945
	Pounds	Pounds	Percent	Pounds	Pounds	Percent
Local ^{1/}	56,082,000	62,551,000	- 10	450,000	-	-
California	17,000	48,000	- 65	-	-	-
Gulf States	74,000	245,000	- 70	162,000	-	-
Alaska	382,000	604,000	- 37	14,624,000	21,805,000	- 33
British Columbia	3,630,000	3,728,000	- 3	1,917,000	527,000	+ 364
Other ^{2/}	37,000	8,000	+362	10,000	35,000	- 71
Total	60,222,000	67,184,000	- 10	17,163,000	22,367,000	- 23

^{1/}Washington, Oregon, plus a small amount from Idaho.

^{2/}Minnesota, New York, Manitoba, and Nova Scotia.

Fresh and frozen fish from British Columbia amounted to over 5½ million pounds, 30 percent greater than the 1945 import total of 4,225,000 pounds. Sole and other fillets accounted for almost one million pounds of this quantity. This represented an increase of 308 percent over the 1945 imports of filleted fish.

Of the 34 major classifications comprising the total arrivals, 11 accounted for 91 percent of the total volume. Heading the list was salmon--all kinds--with a total of 21,912,000 pounds. In second place was halibut with 20,458,000 pounds, while rockfishes, with 7,118,000 pounds, were in third place. Following these species were:

	Pounds		Pounds
Soles	- 5,806,000	True Cod	- 1,918,000
Sablefish	- 4,666,000	Oysters	- 1,877,000
Livers and viscera	- 4,579,000	Crabs	- 1,486,000
Lingcod	- 3,484,000	Sole and other fillets	- 1,438,000

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Receipts of fresh and frozen salmon increased about 9 percent over 1945. Since 1946 was a cycle year for chum and sockeye salmon, catches of these species, particularly in the Puget Sound region, were higher. The run of sockeye salmon overloaded the canneries shortly after they started operations and considerable quantities were diverted into the fresh markets. The king and silver salmon runs were spotty and tardy throughout most of the trolling period. While late seasonal catches of kings showed improvements, silvers did not appear in quantity at any time. Local receipts of silver salmon were about one and a half million pounds below the 1945 figure of 2,997,000 pounds. A large part of the 1946 chum salmon catch was taken in Seattle's immediate waters, enabling many purse-seiners to make several sets daily.

Slightly over 353,000 cases of canned salmon were packed in Washington canneries during 1946, 32,000 cases less than in 1945. The canning of sockeyes in the Sound area did not start until the latter part of July, pending a number of adjustments of cannery wages. Ninety-six percent of the current pack consisted of sockeye salmon.

Throughout most of the year, salmon prices were a troublesome problem. On October 1, the OPA removed price control on these fish. Immediately, prices jumped to as high as 43 cents a pound for troll kings and 38 cents for troll silvers. Within a short time, however, prices dropped to an average of 38 cents for kings and 35 cents for silvers. The rise in prices for salmon caught by gill nets and purse seines was less sharp so the leveling-off process was less drastic.

Halibut fishermen, with the season opening on May 1, experienced a very productive year. Weather conditions and vessel catches were generally satisfactory. Halibut fishing was closed in Area II in June after 42 days' operations and in Area III on August 19, 111 days from the opening date. These were the shortest fishing periods on record for both Areas. Landings by the trawl-line fleet at Seattle were 11 percent greater than in 1945.

Of the nearly 60-million pound catch of halibut, Seattle received and handled from all sources, better than a third of that amount, or 20,458,000 pounds. This was about 12 percent below the 1945 receipts of halibut and was due, principally, to the complete halting, for over two months, of shipments of frozen halibut from Alaska, by a coastwise maritime dispute.

During the first part of August when price ceilings were reinstated, Seattle halibut fishermen refused to sell their catch, amounting to nearly a million pounds, at ceiling prices, and froze it for future sale. On August 16, three days before the season closed, the OPA decontrolled halibut and prices for the fresh fish rose from 17½ cents a pound for mediums to 28½ cents. After the regular fishing closed, prices for halibut caught incidentally to other types of fishing increased still



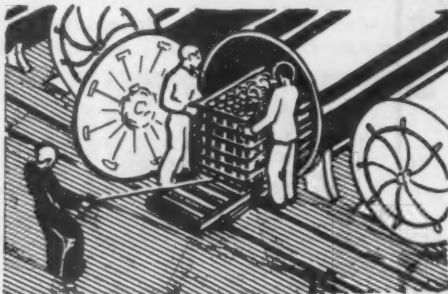
PART OF SEATTLE'S WATER FRONT

further. A level of 35 cents a pound for all grades was ultimately reached which continued during the balance of the period when halibut is allowed to be caught.

The otter-trawlers enjoyed a productive year making 1,213 trips to the Straits and offshore fishing grounds. They landed 15,911,000 pounds of bottomfish. The bulk of these landings, however, were made during the first seven months of 1946.

Landings of rockfishes and true cod became so heavy that local buyers, as well as those at other Washington and Oregon ports, imposed a 5,000-pound purchase limit per boat for these fish. When the cold-storage stocks of frozen fish were gradually reduced and market conditions became more normal, the purchase limit was removed. Largely as a result of curtailment of purchases by the Armed Forces and the subsequent catch-per-vessel restriction, rockfish receipts totaled only 7,118,000 pounds in 1946 and dropped to about one-half that of 1945. When deliveries of rockfishes and true cod were discouraged, trawl fishermen turned their efforts to catching the more desirable and higher priced soles. These species, mostly English and petrale sole, totaled 5,806,000 pounds, about 4 percent above the 1945 total. Total trawl landings were nearly 34 percent under 1945 when over 24,151,000 pounds were landed.

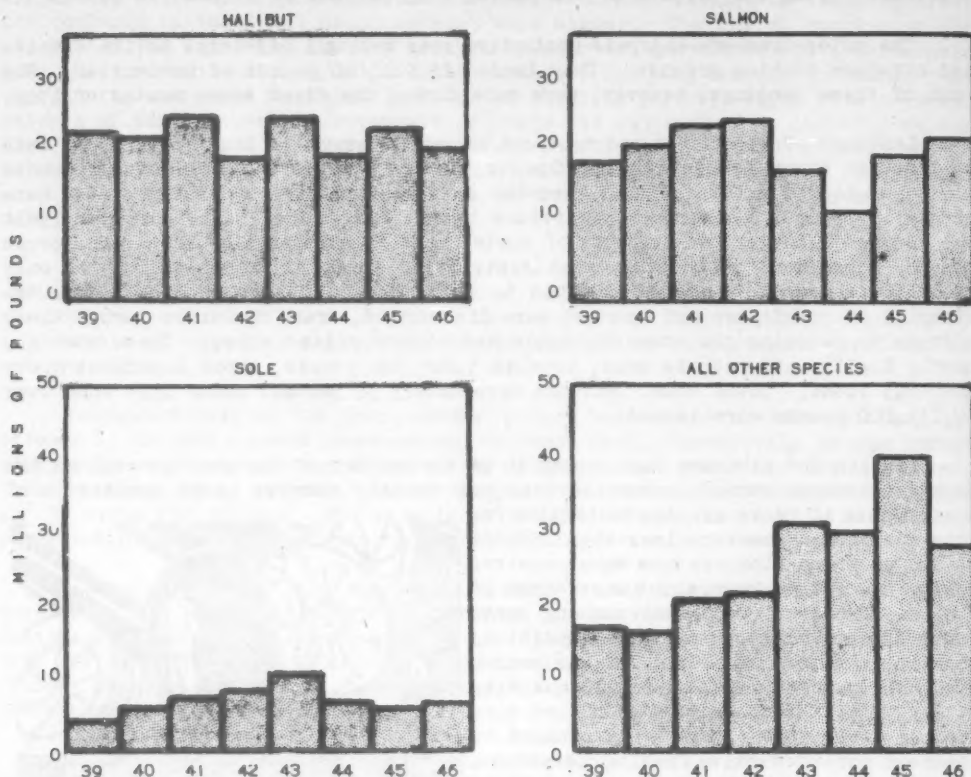
Fishing for albacore tuna proved to be the mystery of the year as well as the greatest disappointment. Seattle does not usually receive large quantities of tuna because it lacks canning facilities for this species. However, less than 155,000 pounds of fresh albacore tuna were received during the entire year, about one-fourth of the 1945 receipts. Coastal canning ports in Washington and Oregon reported conditions generally unfavorable throughout the season with this fish failing to appear in quantity at any time. Many vessels abandoned tuna fishing early in the season and changed to other and more productive fishing operations. Indicative of the disastrous season both as to financial outlay and fishing effort was the total pack of canned tuna for Washington and Oregon of about 192,000 cases in 1946 compared with 470,000 cases packed in 1945, and 846,000 cases packed in 1944, the peak year.



The west coast maritime dispute which began in October and extended throughout November in the Puget Sound region seriously affected Seattle's receipts of frozen fishery products from Alaska. These shipments, which totaled 21,805,000 pounds in 1945, dropped to 14,624,000 pounds in 1946, a decline of 33 percent. For two months, coastwise traffic was at a standstill with no vessels other than food or relief ships, permitted to land or depart. Heavy quantities of canned and frozen fishery products, meals and oils, awaiting stateside delivery, were forced to remain either in Alaskan warehouses or aboard ship in Seattle's harbor. The dispute was ultimately settled, in December, and shipping rapidly returned to normal.

Despite the decline in total receipts from 89,551,000 pounds in 1945 to 77,385,000 pounds in 1946, the value to fishermen was approximately \$15,393,000, an increase of nearly \$400,000 over the 1945 value of \$14,996,000. Thus, the average price returned to the fishermen rose from 17 cents to 20 cents a pound. The principal reasons for the rise in overall value during 1946 were a number of early upward

RECEIPTS AT SEATTLE, 1939-1946



adjustments in OPA ceiling prices together with subsequent price decontrol for some selected species, and the eventual removal of all price control, for fresh and frozen fishery products. Salmon and halibut prices, in particular, were doubled and in some cases, tripled in the first upward surge but gradually regained balance and sought more reasonable ranges. Price levels of trawl-caught species and other bottomfish remained fairly steady throughout the year.

In addition to the fresh and frozen receipts, a total of 8,071,000 pounds of cured products arrived at the local port during 1946, an increase of about 5 percent over the 1945 cured fish receipts. The bulk of these products consisted of mild-cured salmon, 5,149,000 pounds; salted salmon, 1,331,000 pounds; and salted herring, 1,202,000 pounds. The nearly 2 million gallons of various fish oils was far below the 1945 oil receipts. Over 12,000 tons of fish meal arrived during 1946 and slightly exceeded the previous year's meal tonnage.



STUDIES ON DETERIORATION OF VITAMIN A IN FISH LIVERS AND LIVER OILS ✓

PART III—LOSS AT 37° C. OF VITAMIN A FROM LIVER OIL IN PRESENCE AND ABSENCE OF GRAYFISH LIVER TISSUE

By G. I. Jones,* F. B. Sanford,* and D. Miyauchi *

ABSTRACT

Under similar storage conditions, the loss of vitamin A from the livers of the grayfish (*Squalus suckleyi*) was essentially the same as from the extracted oil. The vitamin A was found to be quite stable whether in the liver or in the oil.

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This laboratory was called on to determine whether, under similar storage conditions, the loss of vitamin A would be more rapid from grayfish (*Squalus suckleyi*) livers than from the extracted oil. The results of the following experiments indicate that the losses in each case are small and not significantly different.

Two types of grayfish liver oils were investigated. "Water-separated oil" was prepared by the "steaming method;" that is, the liver material was cooked briefly in boiling water and then centrifuged. "Solvent-extracted oil" was prepared by washing the ground liver with petroleum ether. These two oils were tested because it was considered possible that the amount of natural antioxidants and associated substances present might be different and thereby lead to contrasting data.



To prepare the liver and oil for the first test, 5 gallons of recently landed, iced, grayfish livers were passed through a meat grinder and then stirred vigorously to obtain a homogeneous material. Twenty-four wide-mouthed, 4-ounce, glass jars were filled with this material to a depth of $\frac{3}{4}$ inch. This exposed to the air a surface area which was large in proportion to the size of the sample. A second series of 24 such jars was filled in a similar manner with the oil extracted by the "steaming method" from a portion of the homogenized livers.

The two lots of samples were then placed in an air oven adjusted to a temperature of 37° C. This temperature was chosen because earlier studies had shown that at temperatures much lower than this the loss of vitamin A was so slow that an inconveniently long storage period would be needed before significant changes could be observed. The liver and oil samples were placed alternately adjacent to one another on the oven shelves so that any temperature gradient in the oven would affect the liver and oil samples equally. Before the start of the test, the liver material and the prepared oil were assayed for their vitamin A content.

¹/This is one part of a series of articles on this subject. Part II will appear in a later issue. Part I of this series appeared in the February 1947 issue of Commercial Fisheries Review.

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For the second test, another 5 gallons of recently landed, iced, grayfish livers from a different shipment was ground as before; and portions of the fluid material were placed in similar jars in the same manner. From a second portion of the fluid material, oil was prepared by extraction with petroleum ether by the following method: To each of four pint jars half full of ground liver were added a liberal amount of anhydrous sodium sulfate and about one-third of a pint of petroleum ether. The jars were tightly covered and agitated vigorously on a shaking machine for one-half hour. The contents were allowed to settle, the solvent-oil layer was decanted, and the liver residue was re-extracted with a second portion of fresh solvent. The solvent-oil extracts were then combined, filtered, and placed on a steam bath to remove the solvent. The last trace of petroleum ether was removed as completely as possible by heating and stirring the oil on a steam bath for a short period. This oil was cooled and placed in wide-mouthed glass jars in the same way as before. The jars of liver and oil were then placed in the 37° C. oven for storage. As before, the liver and oil samples were assayed for vitamin A at the start of the storage period.

Shortly after the beginning of the storage test, the liver samples developed a foul, putrid odor and showed evolution of gas. The oil samples, however, showed no visible change during the storage period. One of the oil samples was used as a "pilot" to indicate when a measurable loss of vitamin A had occurred, and aliquots from this jar were assayed at weekly intervals. It was not until three weeks had passed that a definite loss in vitamin A was observed, and then the decrease was only 2.5 percent.

After 30 days of storage, the 24 jars of liver material and 24 jars of oil constituting the first test were removed from the oven. The jars of liver were divided at random into four groups of six jars each. The jars of liver oil were grouped in a similar manner. The samples of the second test involving the solvent-extracted oil were handled similarly.

In all the various assays of the liver material, the oils used for the assays were extracted from the material as follows: The sample was mixed thoroughly and a 3- to 5-gram aliquot was transferred by means of a large-bore pipet to a 2-ounce, narrow-mouthed, tared centrifuge bottle provided with a tight-fitting, extracted cork, and the sample weight determined to within 0.001 gram. Approximately 5 grams of pulverized, neutral, anhydrous sodium sulfate and exactly 25 ml. of petroleum ether (Skellysolve F, or equivalent grade) was added to the sample, which was immediately stoppered tightly and shaken until the vitamin A and oil were in complete equilibrium with the solvent phase.

When equilibrium was obtained, the solvent layer was inspected; and, if found to be free from all turbidity, aliquots for vitamin A and fat were drawn. If turbidity persisted in the solvent phase, the entire mass was centrifuged until a clear solvent layer was obtained.

A 1-ml. aliquot was transferred to a 100-ml. volumetric flask and diluted with "anhydrous" isopropanol for spectrophotometric examination.

A 5-ml. aliquot was pipetted into a tared flask and rendered free of solvent by heating on a water bath.

The percentage of oil in the sample was calculated by the following formula in which S = sample weight and W = weight of oil in aliquot:

$$\% \text{ oil} = \frac{W(25 \times 100)}{S(5 - W)} \\ 0.92$$

The sample weight used in calculating E (1%, 1 cm.) was one-fifth of the weight of oil derived from the 5-ml. aliquot.

The optical densities of the various oils were measured with a Beckman quartz spectrophotometer over a series of wave lengths ranging from 300 to 370 mμ. to determine the content of vitamin A and to what extent non-specific, light-absorbing substances might have developed during storage. Only the two ratios, E at 300 mμ. to E at 328 mμ., and E at 350 mμ. to E at 328 mμ., are given in Table 1, since they illustrate sufficiently the changes observed.

Table 1 - Comparison of E Value (Extinction Coefficient) Ratios of Grayfish Liver Oils: For Fresh and Stored Oils and for Oils Extracted from Fresh and Stored Livers

Material	Storage Period Days	E at 300 mμ. E at 328 mμ.	E at 350 mμ. E at 328 mμ.
Ground liver No. 1	0	.704	.563
	31	.744	.571
	0	.704	.563
Water-separated oil	31	.739	.557
	0	.703	.558
Ground liver No. 2	30	.724	.562
	0	.731	.554
Solvent-extracted oil	30	.785	.547
	0	.731	.554

Note: Samples were exposed to the air and held at 37°C. during the storage period.

Since only a slight increase occurred on storage in the ratio of the E value at 300 mμ. to the E value at 328 mμ., it is believed that the increase in spurious absorption at 328 mμ. during the period of the test was small. Therefore, the changes shown by the data are believed to represent the true loss of vitamin A. The difference in vitamin A loss during storage between the "solvent-extracted oil" and the liver material from which it was prepared amounts to only 0.78 percent and is not statistically significant.

In Table 2 is presented a comparison of the vitamin A content of the ground liver and the liver oils at the inception and termination of the storage period.

Table 2 - Change in Vitamin A Content of Grayfish Livers and Liver Oils During Storage

Material	Average Vitamin A Content of Oil		Loss of Vitamin A during storage
	Start of test	End of test	
	U.S.P. units per gram	U.S.P. units per gram	Percent
Ground liver No. 1	14,532	13,366	8.0
Water-separated oil	9,574	8,798	8.1
Ground liver No. 2	8,439	7,596	10.0
Solvent-extracted oil	7,979	7,120	10.7

Note: Samples were exposed to the air and held for 31 days at 37°C.

It can be noted from the table that the vitamin A potency of the initial "water-separated oil" is considerably below that of the corresponding "analytically extracted" sample. This is probably due to incomplete rendering of all the oil in the liver tissues. However, the percentage loss of vitamin A during storage was about the same for both oil and liver. Therefore, it was concluded that the extractions of antioxidants and associated substances by the "steaming method"

and by the analytical method had been closely similar even though the vitamin A values were different.

Since the loss of vitamin A during storage at 37° C. was essentially the same in the ground liver tissue as in the oil, it can be concluded that any substances which might have accelerated or inhibited the oxidation of the vitamin A in the grayfish livers were about equally active in the extracted oil.

Another conclusion to be drawn from the data is that the vitamin A of grayfish livers is quite stable whether in the ground liver or in the extracted oil. Even at the elevated temperature of 37° C., with the ground liver and the separated oil exposed freely to the air, the loss of vitamin A in 30 days of storage was only 8 to 10 percent.

In earlier experiments^{1/} at this laboratory, it was observed that the rate of oxidative destruction of vitamin A in grayfish liver oil follows the well-known rule of approximately doubling with each 10-degree rise in centigrade temperature. Assuming that the same rule holds under the conditions of the experiment reported in this paper, we can estimate that at 0° C. (the temperature of melting ice) the loss of vitamin A in grayfish liver oil would be less than one percent per month.

^{1/}"A Rapid Test for Vitamin A Stability," by F. B. Sanford, R. W. Harrison, and M. E. Stansby, Commercial Fisheries Review, March 1946, pp. 16-18. Also F.I. 212.



METHODS OF NET MENDING--NEW ENGLAND

Through an oversight, the March 1947 issue of Commercial Fisheries Review did not credit Boris Knake, author of the feature article, "Methods of Net Mending--New England," also as illustrator. The numerous illustrations accompanying the article were his work.

NUTRITIVE VALUE OF BAKED CROAKER

By W. A. Martinek* and C. G. Goldbeck*

ABSTRACT

Croaker fillets were baked in moderate (375° F.) and very hot (500° F.) ovens. Growth tests with rats showed that these two cooking methods produced no significant difference in the nutritive value of the protein. Physico-chemical analyses for thiamine (vitamin B₁), riboflavin (vitamin B₂), and niacin revealed no significant differences in the contents of these three vitamins in the two types of baked fish.

It is rather surprising how little information is available on the effect of cooking methods on the nutritive value of foods. Practically all of the earlier analytical work on determining nutritive value was confined to using raw products as samples. This was probably done because most cooking methods affect the inherent moisture and fat content to a variable extent and may require the addition of other ingredients such as flour, spices, and foreign fats in the preparation of the various dishes. Now, however, greater emphasis is placed on the determination of the nutritive value of foods as they are ordinarily eaten so that a better estimate can be made of how well specific daily diets meet the recommended allowances for the different food elements.



Baker (1943) reported the following data collected by McCance and Shipp on the decrease in the content of protein and certain mineral elements on cooking English catfish (wolfish, *Anarchichas lupus*).

	Percent Decrease From Weight in Raw Fish				Percent Decrease From Weight in Raw Fish		
	Boiled	Steamed	Fried		Boiled	Steamed	Fried
Gross weight	28.0	24.5	24.0	Potassium	39.6	29.8	3.4
Total nitrogen	6.6	5.6	0.1	Calcium	21.6	16.4	6.4
Purine nitrogen	17.6	15.8	1.7	Magnesium	27.5	23.0	5.2
Non-protein nitrogen	35.0	23.6	2.1	Phosphorus	30.0	24.0	2.9
Sodium	39.5	31.0	4.4	Chlorine	43.5	35.0	2.3

The largest significant loss is in gross weight and is mostly a decrease in moisture content. It is interesting to note that this loss is almost uniform for the three methods of cooking. The smallest decrease for most elements is in the fried fish. The rather large decreases expressed for certain of the food elements are more apparent than real. The quantity in the original sample may have been very small, and an insignificant decrease from the nutritive standpoint may be represented by a high percentage loss. It is safest to calculate analytical data to weight units per 100 grams, or to weight units per average serving portion.

Drummond (1918) after feeding a boiled suspension of the minced flesh of herring, cod, and salmon concluded that the nutritive value of the cooked protein

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of these fishes was equal to that of beef. Marks and Nilson (1946) concluded that ordinary cooking methods had no adverse effect on the nutritive value of the protein of cod. These workers fed limited quantities of the cooked fish in growth experiments with rats. Poling and co-workers (1944) reported that the nutritive quality of the protein of cured pork shoulder may be lowered slightly by a commercial canning process. Also, the protein of fried fresh pork was found to be slightly superior in nutritive quality to that of roast fresh pork. Schweigert, Tatman, and Elvehjem (1945) found that about 97 percent of the leucine, valine, and isoleucine content was retained in meat after it had been cooked.

In respect to vitamin content, McIntire, et al. (1943) reported an average retention of 70 percent for thiamine after meat was roasted and broiled, and 50 percent retention after being braised. There was an 85 percent retention of riboflavin irrespective of the cooking method used, an 85 percent retention of niacin after the meat was roasted and broiled, and 65 percent after being braised. The total retention in the meat plus drippings was found to be the same for all methods; namely, about 70 percent for thiamine and at least 90 percent for riboflavin and niacin. Jackson, et al. (1945) reported only 46 percent retention of thiamine in roast pork instead of about 70 percent as reported by McIntire. There was a 90 percent retention of riboflavin and a 75 percent retention of niacin. A higher retention was reported in fried pork chops than in roasted pork butts. Brady, et al. (1944) found that there was a 70 to 80 percent retention of thiamine in pork loin muscle cooked to an internal temperature of 87° C., when the thiamine content was calculated to a dry, fat-free basis. The retention of riboflavin was about 80 percent.

In order to obtain more data on the effect of cooking on the nutritive value of fish, comparative tests were conducted in which croaker flesh was baked at a moderate oven temperature of 375° F. and also according to the Spencer hot-oven method, at a temperature of 500° F.

Experimental Data

Fresh croakers (*Micropogon undulatus*) were purchased locally and filleted at the laboratory. Lots 1 and 2, consisting largely of fish averaging 1½ to 2 pounds in weight in the round, were used in feeding experiments to determine the nutritive quality of the protein and for vitamin assays. Lot 3, consisting of fish less than 1 pound in weight, was used for vitamin assays only.

Baking was carried out under conditions similar to those used in the average household. One-half of each lot was baked in a lightly greased pyrex dish at an oven temperature of 375° F. for 20 minutes. The other half of each lot was baked in a similar manner, but at an oven temperature of 500° F. for 10 minutes according to the Spencer hot-oven method of baking. A portion of raw fish from Lot 3 was reserved for vitamin assays. Any free moisture remaining in the dish after the baking was mixed into the baked fillets. The mixed fish flesh was compressed into blocks, wrapped in cellophane to prevent dehydration, frozen, and stored at 4° F.

Fillets from Lots 1 and 2, which had been baked at 375° F. decreased in weight on an average of 24.8 percent, while those baked at 500° F. decreased in weight about 18.0 percent. This was largely a reduction in moisture content. The fillets from the smaller fish in Lot 3 lost less than 3 percent when cooked to the same degree as the larger pieces. The protein content (Nx 6.25) of the fillets from Lots 1 and 2 was 28.6 and 22.9 percent, respectively, for the portions baked

at 375° F. and 25.1 and 20.6 percent, respectively, for the portions baked at 500° F. The ether extract content was about 3.25 percent, and the mineral matter content about 1.15 percent for both series.

Feeding tests of 8 weeks' duration were conducted with rats to determine the nutritive quality of the protein of the baked fish. Weanling rats weighing 49 to 55 grams were allotted to the test groups. They were housed individually in wire-screen cages over screen floors. Water and a low protein basal diet were available at all times. The basal diet provided all necessary food elements except protein for normal growth and consisted, in parts by weight, of the following:

Corn starch - 80	Cod liver oil - 2	Dried brewer's yeast - 1.5
Lard - 10	Wheat embryo - 2	Wilson's liver concentrate - 0.5
		U.S.P. XI No. 2 salt mixture - 4

The basal diet contained 1.6 percent protein which was included in the calculations involving protein intake.

The frozen baked fish was fed separately in a castor cup as a daily supplement to furnish protein. The quantity was increased at the third and eighth week to provide a reasonably constant ratio of fish protein to basal diet. The average percent protein in the total diet was 12.4 percent for the diet containing fillets baked at 375° F. and 12.6 percent for the diet containing fillets baked at 500° F. At this level, protein is the limiting factor for growth of young rats, as shown by Lanham and Lemon (1938).

Table 1 - Average Gain in Weight and Protein and Food Intake during an 8-week Period

Croakers baked at °F.	Number of rats	Gain in weight		Average protein intake	Average food intake
		Average	Coefficient of variation		
		Grams	Percent	Grams	Grams
375	10	113.0	15.1	55.8	441.8
500	9*	116.8	14.1	56.5	457.1

*One rat died of pneumonia during the sixth week.

The data in Table 1 indicate that the two groups grew at about the same rate. The mean gain in weight differed by only 3.8 grams, and this statistically non-significant difference would be reduced if the gain in weight were adjusted to an equalized protein and food intake. The two temperatures used in the baking of the fillets had no differential effect on the nutritive quality of the protein for balancing the diet.

The thiamine and riboflavin contents of the fish were determined according to the method of Conner and Straub (1941), except that adsorption and elution was eliminated in the assay for thiamine. Numerous assays of fish for thiamine have failed to show any significant differences between adsorbed and unadsorbed extracts. The niacin content was determined by the method of Waisman and Elvehjem (1941) with slight modifications. According to recent studies, the values found may not be absolutely quantitative; but they should be relatively correct, and comparable within lots.

The data in Table 2 show that the thiamine and riboflavin contents in the three lots of fish varied considerably. The fillets of Lots 1 and 2 baked at 375° F. contained less thiamine and riboflavin per hundred grams of dry matter, and in a similar ratio per serving portion, than did the fish baked at 500° F. At first glance, the differences might be interpreted as being significant, but on a serving portion basis they amount to an average of only 0.02 milligrams of

thiamine or riboflavin. These amounts are only a small part of the daily allowance of either vitamin. From the practical standpoint, there was no differential

Table 2 - Data on the Thiamine, Riboflavin, and Niacin Content of Baked Croaker Fillets

Lot	Baking temperature °F.	Dry matter content Percent	Serving portion* Grams	Milligrams per 100 grams					
				Baked Sample			Dry Matter Basis		
				Thiamine	Riboflavin	Niacin	Thiamine	Riboflavin	Niacin
1	375	37.8	69	0.136	0.090		0.360	0.235	
	500	32.5	80	0.168	0.100		0.516	0.307	
2	375	28.9	90	0.121	0.150		0.417	0.517	
	500	26.4	99	0.126	0.150		0.477	0.568	
3	raw	17.2	151	0.081	0.100	5.5	0.470	0.581	31.8
	375	19.5	134	0.076	0.102	5.5	0.390	0.523	28.2
	500	20.9	125	0.081	0.109	5.9	0.387	0.521	28.3

*Value calculated on the basis that one-third pound of raw fillet equals a serving portion and that the dry-matter contents of the raw fish in each of the three lots were equal.

effect of the two temperatures on the thiamine and riboflavin contents of the cooked fillets. This conclusion is probably also true for the niacin content as well.

Conclusions

Croaker fillets can be baked at a moderate oven temperature of 375° F., or according to the Spencer hot-oven method, at 500° F. without a significant differential effect on the nutritive value of the protein, or on the content of thiamine and riboflavin. There is probably no differential effect on the niacin content as well.

This study is limited to the effect of these methods on nutritive value, and is not concerned with other factors which may influence a choice.

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PROTEINS

All proteins are complex compounds built up of a number of simple nitrogenous substances called "amino acids," of which about 10 are essential to body maintenance and growth. Meat and fish proteins are designated "complete" proteins since they contain all of the essential amino acids in about the right proportion, while those from vegetable sources are less complete. Fish and other animal proteins should be included in the diet to balance the vegetable proteins, so better use can be made of them.

Lanham and Lemon (1938) found that the proteins of the fishery products which they tested compared very favorably with the protein of round steak and casein in growth-promoting value. Oyster protein was found markedly superior to the others, and apparently the fish which contain 10 percent or more of fat have somewhat more complete proteins than those which contain less fat, although the difference was not great.

--Research Report No. 7

TECHNOLOGICAL RESEARCH IN SERVICE LABORATORIES FEBRUARY 1947

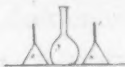
Boston, Mass.

Smoked, cured pollock fillets were tested chemically and by a taste panel. A regular meat cure made the fillets too salty, but batches that had been salted more lightly received favorable comment and have been distributed for further tests.



* * *

At the Eastport, Maine, station an electric oven was built and used for experiments in which raw sardines in uncovered cans were placed between two electric heating plates and dried in a slow stream of air. This appears to be a satisfactory method for drying sardines during the canning procedure. A report on the sardine canning investigation was given before the Maine Sardine Packers Association meeting at Bangor on February 21.



College Park, Md.

The pH of the frozen oysters that have been stored for 10 months at 10° F. has dropped to 5.9, and it appears that these oysters will not remain in salable condition much longer. In contrast, oysters stored at 0° F. and -10° F. showed no appreciable change in pH.

* * *

Fillets of sea trout and Spanish mackerel have not changed noticeably after 4 months in frozen storage.

* * *

A fish-cookery demonstration was given for the Nutrition and Food Preparation class at the University of Syracuse.

* * *

Samples of insulated shipping containers have been received from a manufacturer. Their usefulness in the shipment of small lots of frozen fish will be determined.

* * *

Two tests were made of the shipment of fresh fish by air.

* * *

Of the 263 cultures collected in the Parker River area, 190 were purified by passage through special media and subjected to identification tests. Bacteriological examinations were made of the droppings from ducks and gulls taken in the refuge.

The Fish and Wildlife Service, the U. S. Public Health Service, and the State of Massachusetts signed an agreement providing for cooperative work on the Parker River survey.

* * *

Special tests were carried out on the effects of minute concentrations of KCN on the cultural characteristics of coliform bacteria.



Ketchikan, Alaska

Further assays were run on the content of vitamins A, B₁, and B₂ in salmon trimmings. A preliminary report on the chemical analyses of salmon cannery trimmings was prepared and mimeographed.

* * *

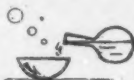
Data for the survey of freezing facilities were obtained at Ketchikan, Wrangell, Petersburg, and Sitka.

* * *

Reports on the work of the laboratory were submitted to the Alaska House of Representatives.

* * *

Clam samples for the toxin study were collected at Ham Island.



Seattle, Wash.

Over 750 people attended the laboratory's open house during the evenings of February 27 and 28. Exhibits and short talks were presented by the laboratory staff to illustrate the role of science in fishery technology.

* * *

A talk on the utilization of Alaskan salmon cannery waste was given before the Annual Salmon Cutting Convention of the National Cannery Association.

* * *

The motion pictures "Home Cookery of Fish" and "Fish is Food" were shown to a community club, and a cookery demonstration was given before a group of home economists.

* * *

Dr. Bogdanov, head of fishery investigation in the U.S.S.R., visited the laboratory and spoke on Russian fishery research. (Ed. Note: Dr. Bogdanov's talk

was reproduced in the February 1947 issue of Commercial Fisheries Review. It is also available as Separate No. 168.)

* * *

Tests of seal-carass oil confirmed previous assays showing that little vitamin A was present. Experiments were started on the extraction of vitamin A oils from pink salmon cannery offal, and apparatus was set up for freeze-drying salmon waste. Samples of pilchard meal were assayed for oil in cooperation with the Association of Official Agricultural Chemists. NDGA, when supplemented by citric or ascorbic acid, was significantly effective in increasing the stability of halibut liver oils. Laboratory findings on the stability of vitamin A in fish livers were presented at a Customs hearing.

* * *

King crab meat that had been vacuum packed and frozen was found to be slightly flat in flavor and dull in color. King crab meat frozen in bars and glazed was flat in flavor and tough after two months in frozen storage.

* * *

An experimental pack of salted sole was prepared.



RECOMMENDATIONS FOR USING DDT

Wherever more than a small area is involved, consult county agricultural agents, State or Federal entomologists, wildlife and fishery biologists, and United States Public Health Service officials.



Use one-fifth pound or less of DDT per acre in an oil solution to avoid damage to fishes, crabs, or crayfishes; use less than 2 pounds per acre to avoid damage to birds, amphibians, and mammals in forest areas. Be-

cause of its greater effectiveness, use smaller quantities of DDT in emulsions.

Use DDT only where it is needed. Wherever it is applied by airplane, provide careful plane-to-ground control to insure even coverage and to prevent local overdosage.

Because of the sensitivity of fishes and crabs to DDT, avoid as far as possible direct applications to streams, lakes, and coastal bays.

Wherever DDT is used, make careful before and after observations of mammals, birds, fishes, and other wildlife.

--Special Scientific Report No. 41

FRESH AND FROZEN FISH

New England

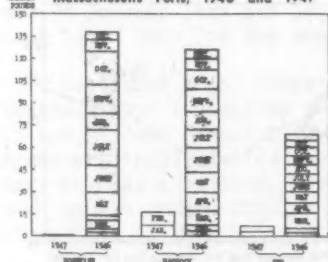
MAINE LANDINGS: Maine fishermen landed 4,738,000 pounds of fishery products, valued at \$472,949, during February 1947, bringing the total for the first two months of the year to 7,744,000 pounds, valued at \$1,010,169, according to Current Fishery Statistics No. 336. Herring, rosefish, soft clams, and lobsters accounted for 82 percent of the volume and 83 percent of the value of the February landings.

During the period from July to December 1946, data on landings at Portland, Maine, were included in the two New England bulletins entitled "New England Landings" and "Maine Landings." However, beginning with January 1947, data on Portland landings will be included only in the Maine bulletin.

During February, landings at Portland amounted to 886,000 pounds, valued at \$43,464. This was a decrease of 27 percent in the volume of the landings at Portland and 26 percent in value compared with the same month in 1946.

* * * * *

Landings of Rosefish, Haddock, and Cod at
Massachusetts Ports, 1946 and 1947



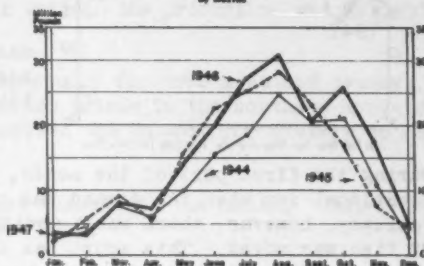
MASSACHUSETTS LANDINGS: Landings of fish and shellfish at the ports of Boston, Gloucester, New Bedford, Provincetown and other Cape Cod ports during February 1947 amounted to 15,927,000 pounds, valued at \$1,474,935 to the fishermen, according to Current Fishery Statistics No. 338. This was an increase of 19 percent in volume and 43 percent in value compared with the same month in 1946. Landings at Boston during the first two months of 1947 were 296 percent greater than in the same period the previous year, while those at Gloucester and New Bedford showed declines of 66 percent and 56 percent, respectively.



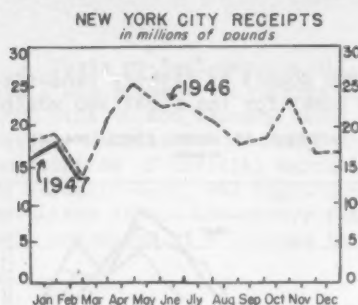
Middle Atlantic

NEW YORK CITY ARRIVALS: Receipts on New York's Fulton Market for the month of February 1947, totaled 13,842,000 pounds which is 18 percent less than the amount received during January 1947, and about 5 percent less than the total for February 1946, according to the Service's New York Market News Office. In addition to the usual stormy weather encountered by the fishermen along the Atlantic coast at this time of the year, more complications set in to shorten the supply in the form of some unsettled labor conditions in two producing areas in New England.

LANDINGS AT MAINE PORTS, 1944-47
By month



Important species that were in abundance were cod, yellowtails, and haddock with a combined total of over 4 million pounds. Other leading items were scup, whiting, and pollock. There were also some southern varieties which were in moderate supply; namely, mullet, Spanish mackerel, and small sized gray sea trout (weakfish). Outstanding among the shellfish items were hard clams, oysters, shrimp, live lobsters, and sea scallops.



Fishing vessels landing at New York City made 58 trips and landed 1,567,000 pounds, representing slightly more than 11 percent of the total receipts.

The market during February was spasmodic. During the first part of the month, business was generally sluggish with only an occasional day when the demand was brisk. By the beginning of the third week of February, however, there was a decided pick-up in the demand and a liberal supply of fish was moved. This spurt was due to the fact that the 19th of February was Ash Wednesday--the beginning of the Lenten season. The remainder of the month was fairly active for limited supplies.

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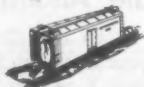
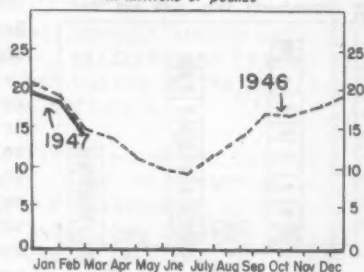
NEW YORK CITY COLD-STORAGE HOLDINGS: Cold-storage holdings of fishery products in the New York City metropolitan area, on March 1, 1947, totaled 14,062,000 pounds, according to the Service's Market News Office in that city. This was a decrease of more than 23 percent compared with the inventory shown for February 1, 1947, and a decrease of over 13 percent compared with the stocks held on March 1, 1946.

While cod fillets, halibut, and salmon were among the leading items held, there were appreciable declines in the holdings of these species compared with last month. Stocks of sablefish, also a leading item, increased over 200,000 pounds.

Fresh-water species showed a slight increase in stocks held. Cisco, sturgeon and spoonbill cats, and whitefish were the outstanding items. This increase was offset by the decline in the salt-water and shellfish figures.

Lobster tails, sea scallops, and shrimp were among the leading shellfish species. Shrimp holdings were over 260,000 pounds less than a month ago and over 1 million pounds less than a year ago.

COLD STORAGE HOLDINGS—NEW YORK
in millions of pounds



Chesapeake

PRODUCTION: Landings of fish in the Hampton Roads area of Virginia during the month of February amounted to 3,117,000 pounds, compared with 2,765,000 pounds in January. This was an increase of approximately 13 percent. For the same period

in 1946 the production was 4,676,000 pounds, according to the Service's Market News Office in Hampton, Va.

Production of fresh picked crab meat in the Virginia-Maryland areas covered by this report amounted to 77,000 pounds, a decrease of 28,000 pounds, or 27 percent from that of the month before. For February of 1946, the production was 141,000 pounds, almost double that for the same period this year.

Production of shucked oysters dropped from 289,000 gallons in January to 221,000 gallons in February. For the same month in 1946 the production was 187,000 gallons.

Demand for all seafoods has been good, especially for crab meat and oysters. The small production of crab meat has resulted in top prices in the northern markets and the steady cold weather in February has caused the demand for oysters to be good all through the month.

Labor organization activities were evident throughout the month. They were the general topic of conversation on the water front.

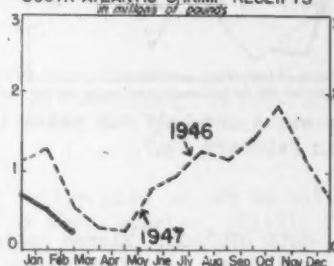


South Atlantic

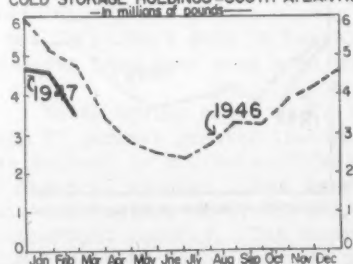
SHRIMP PRODUCTION: Shrimp landings in Florida and the South Atlantic States during February amounted to 249,000 pounds (heads off), 57 percent less than last month and 62 percent less than landings in February 1946, according to the Service's Market News Office in Jacksonville. Florida landings were 70 percent less and Georgia landings 40 percent less than for the same period last year.

Continued high winds and bad weather prevented many of the shrimp vessels from going out to sea. Some of the fishermen, after several fruitless trips, decided to save fuel and await more favorable weather. Most of the shrimp that were caught ranged from medium to very small in size, most of them being small.

SOUTH ATLANTIC SHRIMP RECEIPTS



COLD STORAGE HOLDINGS—SOUTH ATLANTIC



COLD STORAGE: Holdings of fish and shellfish on March 1 for the 5 major cold-storage warehouses in the South Atlantic area totaled 3,458,000 pounds, according to a report from the Jacksonville Office of the Market News Service. Compared with holdings on February 1 of 4,311,000 pounds, this month showed a decrease of 853,000 pounds, or 20 percent. March 1 holdings this year were 1,080,000 pounds less than on March 1, 1946.

The leading items with stocks of over 100,000 pounds are, in order of quantity, as follows:

mullet, fillets (cod, haddock, pollock, and rosefish), shrimp, whiting and king whiting, Spanish mackerel, catfish and bullheads, and scup.

Holdings of fish decreased 721,000 pounds and holdings of shellfish decreased 132,000 pounds during February. Withdrawals of mullet, shrimp, whiting and king whiting, red snapper, Spanish mackerel, pompano, and catfish and bullheads accounted for the major reduction, with smaller decreases in several other species of fish and shellfish. There were some increases in the holdings of croaker, red drum, fillets of haddock, salmon (unclassified), and crabs and crab meat.

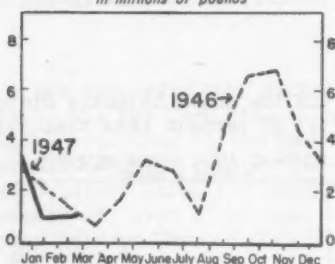


Gulf

PRODUCTION: Inclement weather in the Gulf, during February, seriously affected fishing operations.

February shrimp landings of 985,000 pounds (heads off), for Alabama, Mississippi, Louisiana, and Texas, as reported daily to the Fishery Market News Office in New Orleans, were approximately 9 percent less than January landings, and 36 percent less than the amount landed in February 1946. Only a nominal quantity of shrimp was canned during the month. The closed season for taking shrimp in the inside waters of Louisiana will end next month, March 16.

GULF SHRIMP RECEIPTS—
in millions of pounds



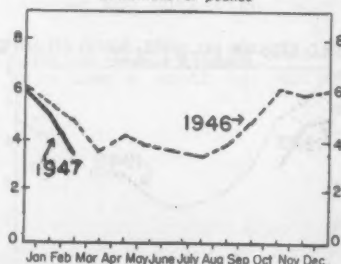
only about one-half the total landed during January, were approximately the same as in February 1947.

COLD STORAGE: Eleven cold-storage warehouses in Alabama, Mississippi, Louisiana, and Texas reported frozen shrimp holdings amounting to 1,602,000 pounds on February 27, 42 percent less than 4 weeks ago, and 29 percent less than holdings on February 28, 1946, according to the Service's Market News Office in New Orleans.

Frozen shrimp withdrawals exceeded the "in" movement by over 1,000,000 pounds during the month.

Holdings of frozen cooked and peeled shrimp amounted to 85,000 pounds on February 27, 32 percent less than 4 weeks ago. Cooked and peeled shrimp holdings one year ago amounted to 5,000 pounds.

GULF COLD STORAGE HOLDINGS
in millions of pounds



Frozen salt-water fish holdings on February 27 were 1,600,000 pounds, 9 percent less than 4 weeks ago, and 35 percent less than one year ago. Mullet, rose-

fish fillets, Spanish mackerel, red snapper, cod fillets, flounder, whiting and king whiting, and red drum (redfish) accounted for more than 50 percent of the total.



Great Lakes

RECEIPTS: Receipts of freshand frozen fishery products in the Chicago wholesale market during February totaled 6,365,000 pounds. This was a decline of 3 percent compared with January and an increase of 20 percent over February 1946, according to the Chicago Fishery Market News Office.

Compared with January, fresh-water receipts declined 28 percent, and were 18 percent below those of February 1946. Salt-water receipts exceeded those of January by 65 percent and were 121 percent above those during February 1946. Shellfish deliveries were 22 percent below those of January but were 41 percent above February 1946.

Chief reason for the decline in fresh-water receipts was the greatly lessened arrivals of whitefish. This consistently leading item fell 43 percent below the January total and was approximately 50 percent below arrivals during February 1946. The leading point of origin for whitefish was the Province of Alberta, Canada.

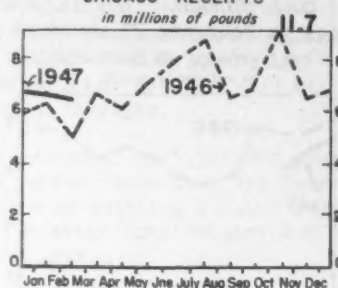
Severe weather conditions in the Great Lakes area affected production and transportation alike. At times, daily arrivals fell to startlingly low levels but, due to demands of the Lenten season, this condition had its favorable reaction in increased withdrawals of cold-storage supplies.

While arrivals of saugers, yellow perch, and yellow pike helped to bolster the curtailed Great Lakes supplies, total receipts of these species, chiefly from Canadian provinces, fell far below the previous month.

The rise in salt-water receipts was the result of heavy supplies, late in February, of frozen halibut and salmon from the Pacific coast. This was a result of the easing of transportation difficulties over the western mountains, allowing deliveries of many delayed shipments. Halibut receipts gained 120 percent over January and salmon showed a 220 percent gain over the same period. Except for a 74 percent gain in East Coast frozen cod fillets, other arrivals of fishery products from that area were comparable to those of the preceding month.

Total shrimp receipts fell 20 percent below those of January; however, they were 77 percent greater than receipts during February 1946. The greatest decline was evident in arrivals of fresh shrimp which approximated but one-third of those of January; however, they were more than double the receipts of February 1946. This fluctuation of fresh shrimp receipts is due to seasonal conditions and is unimportant locally. The important fact, however, is the increasing difficulty experienced by local dealers in their efforts to acquire sufficient stocks of frozen shrimp. The advent, recently, of Mexican shrimp was expected to alleviate

CHICAGO RECEIPTS



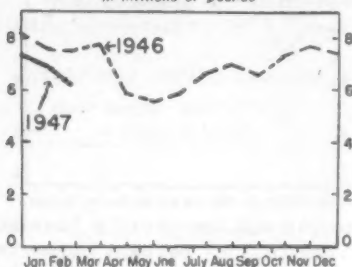
this condition but nothing so far has indicated that this is so, Mexican supplies being, apparently, as difficult to obtain as those from the Gulf.

One unusual development, on the last day of February, was the indifferent reception afforded the initial shipment of fresh king salmon to Chicago. Because of high prices paid the producer, the asking price was high. There were no takers. It is difficult to arrive at any explanation of this condition but the fate of future shipments, when salmon begins to arrive in quantity, will be watched with interest.

* * * * *

COLD STORAGE: Holdings of fishery products in Chicago cold-storage warehouses on February 27 amounted to 6,017,000 pounds, a decline of 14 percent from holdings on January 30. Compared with holdings one year ago on February 28, 1946, the current total represents a decline of 19 percent, according to the Service's local Market News Office.

COLD STORAGE HOLDINGS — CHICAGO
in millions of pounds



Chiefly responsible for the decline was the lack of fresh fish received in the local market. This situation caused greater withdrawals of cold storage holdings to bolster dealers' stocks during the Lenten season.

Large receipts of frozen fish, late in February, prevented holdings from registering still greater reductions.

Holdings of fresh-water fish declined 19 percent as compared with January and were 35 percent below holdings on February 28, 1946. Salt-water stocks declined 10 percent below January holdings and were 4 percent below those on February 28, 1946. Shellfish holdings declined 20 percent below those of January 30 and were 31 percent below stocks held on February 28, 1946.

Chief among the withdrawals of fresh-water items were chubs, lake trout, whitefish, yellow perch, and yellow pike fillets. Among salt-water items, rosefish fillets declined 23 percent, while cod fillets gained 4 percent during the month. Halibut, with a comparatively small amount held in storage, declined 23 percent during February, while salmon holdings, also with light stocks in storage, increased 30 percent over January. Shrimp holdings declined 18 percent during the month, while supplies of other shellfish items fluctuated sharply from day to day due to nominal amounts in storage.



Pacific

ARRIVALS: Landings and receipts of fresh and frozen fishery products, including livers, at Seattle totaled 4,798,000 pounds during February, the Service's local Market News Office reported.

This was a sharp increase, 126 percent, over January's record low production. Fresh fish and shellfish receipts, mostly from local sources, rose from 638,000 pounds to 1,331,000 pounds, an increase of 108 percent.

An abrupt change for the better in offshore weather permitted the local otter-trawl fleet, making 40 trips to the grounds, to deliver over 700,000 pounds of bottomfish, mostly rockfishes, English and other soles, and true cod. This was a gain of more than half a million pounds compared with January's trawl deliveries of 136,000 pounds obtained in 26 trips. The fishing areas south of Cape Flattery, west of Vancouver Island, and in Hecate Straits were most productive, while catches inside the Straits of Juan de Fuca materially dropped.

The season's first deliveries of troll-caught chinook salmon were made during the month, totaling almost 48,000 pounds. Substantial arrivals of frozen salmon, mostly silvers and chums, sablefish, and nearly 1-2/3 million pounds of frozen halibut further increased the port's receipts.

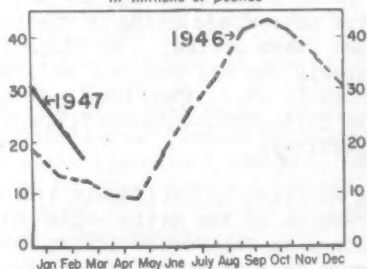
Alaska shipments of frozen fishery products amounted to 3,365,000 pounds, about three times the January volume and nearly 87 percent more than the February 1946 figure of 1,798,000 pounds. British Columbia imports totaling 103,000 pounds, while continuing somewhat low were about 6 percent heavier than January and consisted largely of frozen chinook salmon and sole fillets.

February's arrivals raised the 1947 cumulative total to 6,914,000 pounds, about 3 percent below 1946.

* * * * *

COLD STORAGE: Holdings of frozen fishery products in 30 cold-storage warehouses of the Northwest Pacific region totaled about 17½ million pounds on March 1, according to the Service's Seattle Market News Office.

COLD STORAGE HOLDINGS—NORTH PACIFIC
in millions of pounds



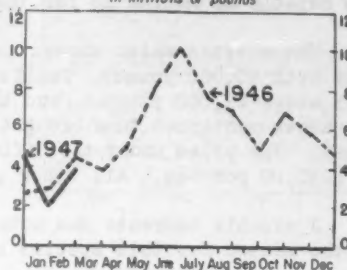
of chum salmon held largely in Washington and Alaska plants which failed to show normal withdrawals.

A rising demand in most markets absorbed most of February's normally low production of fresh fish. As a result, freezings in the region dropped to 396,000 pounds, about 8 percent below January's freezings and 87 percent less than last year when over 3,150,000 pounds were frozen.

* * * * *

LANDINGS IN SOUTHERN CALIFORNIA: Despite the fact that the mackerel landings at San Pedro and Santa Monica dropped about 200,000 pounds during February as com-

SEATTLE RECEIPTS
in millions of pounds



pared with the January landings, the total poundage for all species increased about 15,000 pounds, according to the Service's San Pedro Office. This is encouraging as the mackerel season is over and it indicates that the other species are capable of making up for the lack of mackerel.

The species which showed the greatest increase during the month were barracuda with 90,000 pounds, California halibut with 53,000 pounds, white sea bass with about 13,000 pounds, and bluefin tuna with about 148,000 pounds. Most of the above-mentioned tuna brought 20 cents a pound, or \$400.00 per ton, to the fishermen. The price under the Office of Price Administration was in the neighborhood of \$230.00 per ton. All other prices have also been holding up well.

A sizable decrease was noted in the landings of sardines. This was expected as the season for this species has ended.

Newport and San Diego reported conditions as similar. Both these ports showed an increase in total landings with increases noted in many of the same species as at San Pedro and Santa Monica.

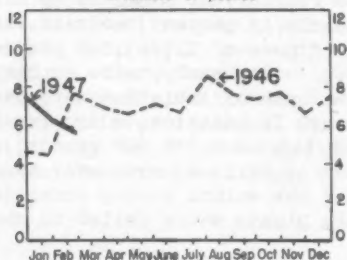
At San Diego, the total landings were 195,000 pounds in February compared with 191,000 pounds in January. Increased landings occurred in California halibut, grouper, rockfish, sea bass, sheephead, and bonito. Decreases occurred in the landings of spiny lobster, barracuda, and yellowtail.

At Newport Beach, the total landings in February were 278,000 pounds compared with 228,000 pounds in January. The species showing the greatest increase over January were anchovies with landings of 48,000 pounds, California halibut with 10,000 pounds, rockfish with 9,000 pounds, and yellowtail with 23,000 pounds.

* * * * *

COLD STORAGE: The holdings of fish and fishery products in cold storage during February followed almost the same pattern in California as did the holdings for the entire nation, according to the local Fishery Market News Office. Holdings in California were nearly one and one-half million pounds less on March 1, 1947, than they were on March 1, 1946 with 5,754,000 pounds and 7,349,000 pounds held, respectively.

COLD STORAGE HOLDINGS—CALIFORNIA
in millions of pounds

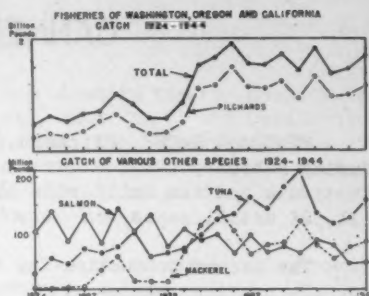


The freezing of fish in California during February was the reverse of the nation-wide pattern. The freezings in California during February 1947 were more than doubled those of February 1946. This year, 616,000 pounds were frozen compared to 297,000 pounds a year ago.

Although the poundage of shrimp imported the first two months this year and the first two months last year was almost the same, the bulk of the shrimp last year was frozen in Mexico or at the border. This year the bulk of the shrimp came across the border as fresh shrimp.

* * * * *

PACIFIC COAST FISHERIES, 1944: The commercial catch of fishery products in the Pacific Coast States totaled 1,667,794,000 pounds in 1944, an increase of 15 percent over the previous year, according to Current Fishery Statistics No. 332. Catches of pilchards, tuna, mackerel, and salmon were all more than in 1943. The amount received by the fishermen for the 1944 catch surpassed that of 1943 by 4 percent and was the largest on record, totaling \$59,801,692. The value of the 1943 catch was \$57,322,690.

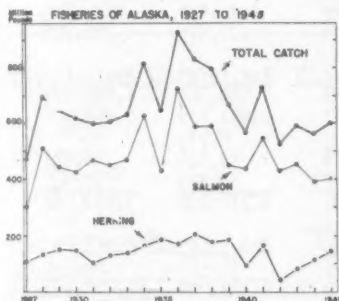


United States

ALASKA FISHERIES, 1945: The commercial catch of fishery products in Alaska during 1945 totaled 596,052,000 pounds, valued at \$22,288,148 to the fishermen. From this catch, products valued at \$58,926,269 were prepared for market, according to Current Fishery Statistics No. 331.

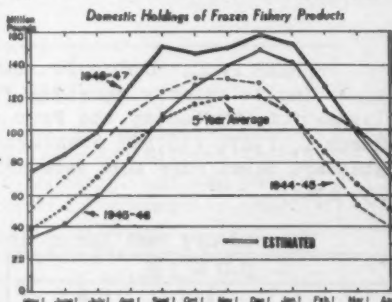
The salmon catch, totaling 402,635,000 pounds, was 2 percent more than the previous year. Herring landings of 139,769,000 pounds were 23 percent greater than those of 1944.

* * * * *



COLD-STORAGE HOLDINGS AND FREEZINGS: Stocks of frozen fish and shellfish, held on March 1 by cold-storage operators reporting their activities to the Fish and Wildlife Service, amounted to 97,939,000 pounds--a decline of 23 percent (29,441,000 pounds) below the holdings on the first of the previous month, according to Current Fishery Statistics No. 328. The decline in holdings during February was the second largest in history. Reports from freezers indicate, however, that stocks may decline an even greater amount in March. It is estimated that April 1st holdings may total about 70 million pounds.

Data on the domestic freezings and holdings of fishery products in the bulletin are based on reports for 213 freezers. These are principally public cold-storage plants.



CANNED AND CURED FISH

Pilchard

PILCHARD PACK: Pilchard (California sardine) landings totaled 12,139 tons during February 1947, according to reports of the California Sardine Products Institute and the California Division of Fish and Game. As a result, a pack of 121,525 actual cases was canned from February 1 to 27, 1947.

The canned production for the month exceeded that of the corresponding period for the previous season, but the season's total was only slightly over two-thirds of the 1945-46 season's pack.

California Sardine Landings, Canned Pack and Byproducts					
Item	Unit	M O N T H		S E A S O N	
		1947	1946	1946-47	1945-46
		February	February	Aug.-Feb.	Aug.-Feb.
Landings	Tons	12,139	9,199	227,675	395,709
Canned		Feb. 1-27	Jan. 27-Feb. 27	Aug. 1-Feb. 27	Aug. 1-Feb. 27
	1 lb. ovals-48 per case	50,412	30,899	636,962	1,158,975
	1 lb. talls-48 per case	68,228	78,627	1,974,522	2,458,306
	1 lb. fillets-48 per case	13	-	8,737	-
	1 lb. round-96 per case	193	1,678	34,446	48,934
	Unclassified	2,679	2,382	62,353	95,869
	TOTAL, Actual Cases	121,525	113,586	2,717,120	3,762,084
Meal	Tons	February	February	Aug. 1-Feb. 28	Aug. 1-Mar. 1
		1,850	1,134	31,197	56,515
Oil	Gallons	59,487	58,196	4,154,869	11,230,607



Shrimp

SHRIMP PACK: During February 1947, 940 standard cases of shrimp were packed, according to reports received from canning plants operating under the Seafood Inspection Service of the Food and Drug Administration. From July 1, 1946 to March 1, 1947, 236,482 standard cases of shrimp were packed. This was 110,047 standard cases more than were produced during the corresponding season to February 23, 1946.

Wet and Dry Pack Shrimp in all Sizes in Tin and Glass--Standard Cases*				
M O N T H		S E A S O N		3-yr. average
1947	1946	1946-47	1945-46	
Feb. 2-Mar. 1	Feb. 3-Feb. 23	July 1-Mar. 1	July 1-Feb. 23	July 1-Mar. 3
940	2,108	236,482	126,435	257,000

*All figures on basis of new standard case--48 No. 1 cans with 7 oz. per can in the wet pack and 6½ oz. per can in the dry pack.



Tuna and Mackerel

CALIFORNIA TUNA AND MACKEREL PACK: The production of canned tuna by California packers during February totaled 198,661 standard cases, according to the California Division of Fish and Game. This was 43 percent more than the January pack and 27 percent over February 1946. The total pack for the first two months of 1947 amounted to 337,751 cases, 3 percent above the production for the corresponding period in 1946.

The pack of mackerel during February was 114,116 standard cases, 47 percent more than January. Only 13,226 cases were canned during February 1946. The 2-month pack of 191,742 cases was 297 percent greater than that for the similar period of 1946.

California Pack of Tuna and Mackerel--Standard Cases*

Item	February 1947	January 1947	February 1946	Two mos. ending with Feb.--	
	Cases	Cases	Cases	1947	1946
Tuna:					
Albacore	-	2	-	2	-
Bonito	4,350	6,197	1,676	10,547	3,001
Bluefin	14,389	-	18,422	14,389	27,351
Striped	30,521	11,532	11,321	42,053	20,201
Yellowfin	114,031	100,504	84,793	214,535	214,543
Yellowtail	2,746	1,848	15,800	4,594	16,314
Flakes	32,624	19,007	24,593	51,631	45,352
Total	198,661	139,090	156,605	337,751	326,762
Mackerel	114,116	77,626	13,226	191,742	48,275

*Standard cases of tuna represent cases of 48 7-ounce cans, while those of mackerel represent cases of 48 1-pound cans.



CANNED FISH SUPPLIES

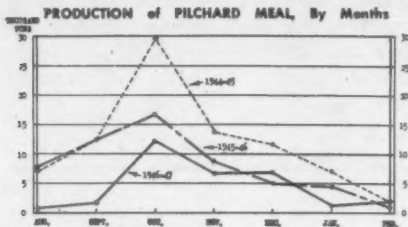
Prospects are good for a larger civilian supply of canned fish in 1947 than in 1946. The 1946 pack, which totaled about 657 million pounds, was considerably below the 1935-39 average of about 690 million pounds. Government purchases declined, while both imports and commercial exports increased. Packs of both salmon and pilchards were short in 1946, and it is unlikely that packs of both would be short in the same year again soon. The tuna pack, however, was the largest in history. The 1947 pack of canned fish is expected to be somewhat larger on the basis of indicated improvements in the availability of supplies, materials, and labor. Adequate supplies of canned fish to meet consumers' needs may not reach the market until late in 1947 because of the small pack of major items in 1946 and because the greater portion of the pack canned in the last half of the year, probably over 75 percent, does not ordinarily reach the consumer until late in the year, or in the following year.

--Fishery Leaflet 215

FISHERY BYPRODUCTS

Oil and Meal

PRODUCTION: The Pacific Coast pilchard (sardine) season which ended in February was one of the poorest in the history of that fishery, according to Current Fishery Statistics No. 333. The total catch of pilchards during the season amounted to only 470,000,000 pounds, compared with 796,000,000 pounds in the previous season, and a 1935-39 average of over 1,200,000,000 pounds. The production of pilchard meal (33,000 tons) was the smallest since 1931, while the yield of pilchard oil (4,500,000 gallons) was the smallest since 1932. The catch of pilchards in the San Francisco district of California during the 1946-47 season amounted to 2,846 tons, compared with 83,480 tons in the previous season. The catch in the Monterey district was 26,818 tons, compared with 142,282 tons a year ago. However, the catch in Southern California amounted to 198,011 tons--an increase of 28,067 tons over the previous season's production.



The February production of oil and meal by domestic firms was somewhat greater than a year ago, however, the total for the first two months of the year, (6,545 tons of meal and 270,815 gallons of oil), was far below the production in January and February of 1946. Decreased landings of rosefish in New England and pilchard in California were responsible for the declines.

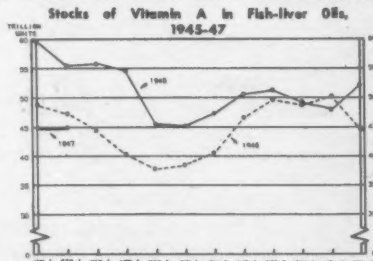


Vitamin A

STOCKS AND PRODUCTION: Stocks of vitamin A in fish-liver oil on February 1 were reported at 44.8 trillion units, only 30,000 million units more than stocks held on the first of the previous month but 5 percent less than those of February 1, 1946, according to Current Fishery Statistics No. 337.

Production of vitamin A during January totaled 4.2 trillion units compared with 4.8 trillion units produced during January 1946. Receipts were up 8 percent while shipments were down 13 percent compared with the same month a year ago.

Receipts of livers during January amounted to 1,085,000 pounds, containing about 3.9 trillion units of vitamin A. During the same month of 1946, 1,310,000 pounds, having a vitamin A content of 4.8 trillion units, were received. Cod made up 46 percent of the total livers received and grayfish (dogfish), 21 percent. Although soupfin shark livers accounted for only 4 percent of the total receipts, their value was 35 percent of the total cost of all livers, and their vitamin A content was more than one-fourth of that total.



OTHER FISHERY NOTES

Ward T. Bower Retires From Federal Service

After 47 years of continuous service in fisheries work for the United States Government, Ward T. Bower has retired as Chief of the Division of Alaska Fisheries of the Fish and Wildlife Service, it was announced on April 3 by Albert M. Day, Director of the Service. Mr. Bower has been located in Chicago since 1942 when the headquarters of the Service was moved from Washington to that city.

"Ward Bower leaves a magnificent record of achievement in the field of conservation, and his retirement will be distinctly felt," said Mr. Day. "His is the longest record of continuous service in Federal fisheries work. In his years of duty, he has become a specialist on Alaska, and an authority on the aquatic resources of that great Territory. Under his administration, the North Pacific fur seal herd has increased from 125,000 animals in 1911 to more than 3,300,000 today, and through wise management during this period of growth, about 1,300,000 sealskins have been taken from surplus male animals to enrich the Treasury of the United States by more than 10 million dollars.

"This outstanding accomplishment in the field of wildlife restoration is only one of the monuments to Mr. Bower's tireless devotion to the cause of conservation," continued Mr. Day. "In addition, he has had a guiding hand in the development and management of the valuable salmon and other commercial fisheries of Alaska, directing and encouraging the research on which has been based legislation and regulations designed to maintain them forever at a high productive level. This is an enviable record for which Mr. Bower is deserving of the highest praise."

Ward T. Bower came by his interest in fishery conservation naturally. Born at Northville, Michigan, on November 17, 1881, his father, Seymour Bower, was for 20 years the active head of the Michigan Fish Commission, the forerunner of the present Department of Conservation of Michigan. Educated in Detroit, Mr. Bower joined the staff of the U. S. Fish Commission as an apprentice fish culturist on July 1, 1900, at the fish cultural station at Northville, Michigan. This organization in 1903 was designated as the Bureau of Fisheries and in 1940 it was merged with the Biological Survey to form the present Fish and Wildlife Service.

For the first ten years of his service, Mr. Bower was identified with fish cultural activities, holding positions of responsibility at stations in Michigan, Minnesota, and California, and finally going to the Washington office as Superintendent of Fish Distribution.

In 1911, Mr. Bower entered full time work in the Division of Alaska Fisheries with which he has been associated continuously ever since, holding variously the positions of Inspector, Assistant Agent, Agent, Administrative Officer, and Chief. During the years since 1911 he has spent many months in Alaska, and in 1922 he accompanied the Assistant Secretary of Commerce on a world cruise to investigate the maritime industries and economic conditions in Russia, Japan, China, India, Egypt, France, Italy, Germany, Belgium, the British Isles, and elsewhere.

Mr. Bower has been a member of the American Fisheries Society since 1900, an officer of the Society for five terms, and editor of its publications two different years. He is also a member of the Biological Society of Washington; the

Cosmos Club, Washington; the Federal Club, Washington; the Arctic Club, Seattle; the Shrine (Moslem Temple), Detroit, and other Masonic bodies in Michigan.

Mr. Bower is the author of more than 40 publications on a variety of subjects in the fields of fish culture, aquarium management, fishery conservation, marine mammals, and Alaska.

Mr. Bower's permanent address is 6011 Nevada Avenue, N. W., Washington 15, D. C.



Maine Sardine Canning Season Changed

The Maine Department of Sea and Shore Fisheries recently announced that an emergency legislative bill extending the sardine canning season in Maine from the previous dates of April 15 - December 1 to March 1 - December 15 was passed late in February 1947. With the new regulations in effect, the majority of Maine canneries began operations on March 1. The 1946 pack of Maine sardines exceeded 3 million cases.



Surplus Marine Materials and Vessels

The War Assets Administration has taken over, for disposal, all marine surplus materials, other than self-propelled boats, which have heretofore been handled by the U. S. Maritime Commission. It issues monthly a catalogue entitled Marine Surplus Seller listing items and their prices. The property is announced concurrently to all priority claimants and commercial users and is available for immediate sale. All inquiries and offers to purchase should be made to the nearest WAA Regional Office or "Customer Service Center."

All vessels having inboard propulsion, except lifeboats, are handled by the United States Maritime Commission. Vessels classified as small vessels--under 1,500 gross tons--that were originally requisitioned or purchased from private owners, or built and owned by the Government and no longer required, are sold by the Maritime Commission's Small Vessel Sales Division, Washington, D. C. Government-owned ships, classified as large vessels--over 1,500 gross tons--are sold by the Maritime Commission's Large Vessel Sales Division, Washington, D. C. Inquiries concerning the availability of these large or small vessels should be directed to the U. S. Maritime Commission, Washington 25, D. C.



Marketing Fish in India

The report entitled "Marketing of Fish in India," on which an article in the March 1947 issue of Commercial Fisheries Review was based, is now available to the public.

Among others, the report includes chapters on types of fishes, fishing gear and fishing methods, supply, preparation for the market, demand and utilization,

wholesale prices, and assembling, storage, transportation and distribution. The report contains numerous photographs, charts, and tables which assist the reader in obtaining an understanding of the difficulties inherent in any attempt to expand the fishing industry of India.

Copies of the report may be obtained from the Manager, Government of India Press, Calcutta, India. The price is 2 shillings or, roughly, 50 cents in U. S. currency.



Maryland's Fisheries

The Maryland Board of Natural Resources recently issued a report entitled, Six-Year Conservation Program, which includes sections on the programs of the Department of Tidewater Fisheries and the Department of Game and Inland Fish. The subjects discussed include: "State Controls Over Fish Populations and Production," "Plans for Oyster Restoration," "Management of the Crab Fishery," "The Inland Fish Program," "Fishery Statistics," "Extent and Condition of Oyster Bars," "Supervision of Commercial Fish Hatcheries," and other topics of interest to the commercial fishing interests, not only in Maryland, but elsewhere.

Copies of this report may be obtained from the Board of Natural Resources, State Office Building, Annapolis, Maryland.



Purchases of Fish by Department of Agriculture

Purchases of fishery products by the U. S. Department of Agriculture amounted to \$7,875,244 during January. Compared with December, this was an increase of \$424,401. Only canned salmon and canned pilchards were purchased during the month, the larger item being canned salmon. From July 1, 1946 to January 31, 1947, purchases reached \$20,825,319.

Purchases of Fishery Products by USDA

Commodity	Unit	January 1947		July 1946 thru Jan. 1947	
		Quantity	F.O.B. Cost Dollars	Quantity	F.O.B. Cost Dollars
FISH					
Fish, ground, canned	Cases	-	-	1,359	8,308
Herring,	"	-	-	7,955	48,631
Mackerel,	"	-	-	27,688	196,634
Salmon,	"	386,864	6,194,128	1,085,739	16,034,158
Pilchards,	"	256,316	1,681,116	712,938	4,537,588
Total	"	643,180	7,875,244	1,835,679	20,825,319

* * * * *

Purchases of fishery products by the U. S. Department of Agriculture totaled \$2,067,538 during February. Compared with January, this was a decline of \$5,807,706. Only canned salmon and canned pilchards were purchased during the month. From July 1, 1946 to February 28, 1947, purchases reached \$22,564,637.

Purchases of Fishery Products by USDA

Commodity	Unit	February 1947		July 1946 thru Feb. 1947	
		Quantity	F.O.B. Cost	Quantity	F.O.B. Cost
FISH			Dollars		Dollars
Fish, ground, canned	Cases	-	-	1,359	8,308
Herring, "	"	-	-	7,955	48,631
Mackerel, "	"	-	-	27,688	196,634
Salmon, "	"	108,498	1,438,822	1,193,957	17,469,760
Pilchards, "	"	90,046	628,716	752,984	4,841,304
Total	"	198,544	2,067,538	1,983,943	22,564,637



Wholesale and Retail Prices

Wholesale prices for all foods showed a decline of 1.1 percent from December 21, 1946 to January 18, 1947. Retail prices for all foods decreased 1.1 percent for the same period, according to reports from the Bureau of Labor Statistics, Department of Labor. The average retail price of fresh and canned fish increased 1.4 percent, while that for fresh and frozen fish remained unchanged. Sufficient information was unavailable to show a comparison between prices of canned pink and red salmon for December 15, 1946 to January 15, 1947.

Wholesale and Retail Prices

Item	Unit	Percentage change from-		
		Jan. 18, 1947	Dec. 21, 1946	Jan. 19, 1946
Wholesale: (1926 = 100)				
All commodities	Index No.	140.8	+0.7	+32.0
Foods	do	157.8	-1.1	+47.1
Fish:		Jan. 1947	Dec. 1946	Jan. 1946
Canned salmon, Seattle:				
Pink, No. 1, Tall	\$ per doz. cans	3.189	0	+62
Red, No. 1, Tall	do	5.363	0	+45
Cod, cured, large shore,				
Gloucester, Mass.	\$ per 100 pounds	15.00	+0.01	+11
Herring, pickled, N. Y.	# per pound	12.0	0	0
Salmon, Alaska, smoked, N. Y.	do	35.0	0	0
Retail: (1935 = 100)		Jan. 15, 1947	Dec. 15, 1946	Jan. 15, 1946
All foods	Index No.	189.8	-1.1	+30.4
Fish:				
Fresh and canned	do	271.3	+1.4	+19.4
Fresh and frozen	# per pound	43.2	0	+18.7
Canned salmon:				
Pink	# per pound can	35.1	*	+50.0
Red	do	59.0	*	+44.6

*Inadequate information.



FOREIGN FISHERY TRADE

Imports and Exports

GROUND FISH IMPORTS: From January 1 to February 28, 1947, there were 2,977,548 pounds of fresh and frozen groundfish imported into the United States under the tariff classification, "Fish, fresh or frozen fillets, steaks, etc., of cod, haddock, hake, cusk, pollock, and rosefish." This was 4,003,661 pounds less than the groundfish imports for the corresponding period in 1946, according to a report from the Bureau of Customs of the Treasury Department.

Commodity	February 1947	January 1947	February 1946	Jan. 1- Feb. 28, 1947	Jan. 1- Feb. 28, 1946
Fish, fresh or frozen fillets, steaks, etc., of cod, haddock, hake, cusk, pollock, and rosefish	1,417,052	1,560,496	3,466,388	2,977,548	6,981,209

Asia

EAST ASIA: The findings of the South East Asia Fisheries Conference have been summarized in the following report to D. W. Le Mare, Acting Director of Fisheries, Malayan Union and Singapore, according to the American Consulate General at Singapore.

A conference of scientists met in Singapore, January 6-8, 1947, to consider the problems of the fishing industries both marine and fresh water, of South East Asia and Australia in order to improve the value of the diets of the peoples of these territories by increasing their consumption of fish. The territories represented at this Conference were India, Ceylon, Burma, Siam, Hong Kong, Malaya, Singapore, North Borneo, Sarawak, Netherlands East Indies, and Australia, and the delegates were specialists known in many parts of the world. In fact, this was a historical occasion, for it is the first time that such a meeting has been convened in this part of the world and the delegates have all expressed their gratitude and pleasure at having met. To give some idea of the magnitude of the problems involved, a discussion was held, at a highly technical level, toward increasing the fish supply for nearly 650,000,000 people. The minimum target set by the nutrition authorities is to provide these people with 4 ounces of fish per head, per day, which means a total catch of nearly 100,000,000,000 pounds of fish per annum. The delegates to the Conference were unanimous in agreeing that this goal can be achieved. You may ask why this insistence on fish. The reason is that the majority of Asiatic peoples have a grave deficiency in the diet, a lack of protein.



Fish in one form or another is acceptable to most of them, and is a readily available form of protein. Now this target at which we are aiming means increasing the fish landings of these territories from 4 to 15 times their present level. This cannot be achieved in a short space of time and without planning and it may be 20 years before it is reached.

In the first place the provision of the essential gear and materials for re-establishing the fishing industries at a prewar level and to prevent them falling into a decline was discussed, for many of the territories concerned have not yet recovered from the ravages of the war. Burma for instance, has twice been a battleground in the course of 3 years. Consequently, the first problems to receive attention were those of rehabilitation of the industry.

The world-wide shortage of food makes reference to the immediate future a particular necessity. There is a serious shortage of cotton yarn needed for nets and tackle, and this is not only holding up the rehabilitation of the fishing industry (after the ravages of the war); but actually in some parts is leading to a decreasing production. A resolution was passed calling immediate and urgent attention to the matter by these organizations--international and national--which have control of the allocation and distribution of supplies of cotton yarn. There is a world shortage of cotton, but every attempt will be made for a special allocation for the fisheries of these waters.

Other urgent needs are for fishing hooks, manila rope, and wire netting. The speeding-up of the industry calls for powered vessels, especially for the purpose of servicing craft propelled by wind so that the fishing grounds may be extended, and the catches brought rapidly to market. There are many needs in respect of processing or preservation by cold storage. Diesel and other engines must be obtained.

Some of the methods of fishing in one area are not in use by the fishermen of other areas. The possibilities of an exchange of personnel and tackle for the extension of various methods was discussed at the Conference. Attention was given to the example of the introduction of methods by the Japanese before the war, when they supplied 35 percent of the fresh fish appearing in the markets of Singapore. The methods the Japanese used widely in South East Asia have largely fallen into abeyance and must be again established.

The question of trawling was considered, it was tried before the war; but scarcity of bottom-living fish in some areas, and above all, coral reefs, which ruin the nets, have precluded its extension; but it is being tried again with some success in Ceylon, and it will be watched by the experts of the other countries for the confirmation of this success.

The production of fresh-water fish in some countries almost equals the harvest from the seas. Some of this fish comes from lakes and rivers, but a great deal of it is from fish farming in ponds, paddy fields, and various collections of fresh water. Although fish culture goes back to early historical times, when in China and Europe several kinds of carp were cultured in ponds, yet fish farming of today needs the hand of the scientist for its further improvement.

The welfare of the fishermen received the attention of the Conference and among the items discussed were fisheries schools, extra rations where the work is particularly hard, loans, cooperative societies, the encouragement of subsidiary occupations in the off season, when the monsoon brings heavy seas.

Marketing facilities in all the territories need many developments. There is a shortage of machinery for making ice.

The importance of this is at once appreciated when it is recalled that the transport of fish from the sea to the consumer needs 4 times as much ice as the weight of the fish, if it is to be preserved in as fresh a condition as is desirable. Ice must be readily available at a very cheap rate for the fishermen, or it will never be possible to increase greatly the supply of fresh fish in the hot climates of these areas. That ice can be cheaply produced has been shown in Ceylon where it is sold by a trading company to fishermen at one rupee a hundredweight.



No nation possesses an ocean. Except for a fringe along the coasts the seas are free to all. The proper study and exploitation of the products of the sea can be dealt with only on an international scale. It is important, therefore, that there should be an organization to follow up the work of this Conference. The collection of scientific knowledge must be the basis for an extension of fishing methods and of fishing grounds, for improvements in processing and marketing, and the conservation of resources.

There is a good deal of information available in various territories, but there must be a central body to get this information together, interpret it and indicate its use. This is very important at the present time since many local records have been lost during the war, and perhaps copies of some of them may exist in other countries and can be collected.

Without a central body, collaboration and allocation of research programs cannot be adequately arranged.

One of the more important resolutions of the Conference was that there should be immediately started a permanent organization to follow up the work of the Conference, and to be the basis for the foundations of an Eastern council to be under the aegis of the Food and Agriculture Organization to which most of the United Nations subscribe.

Bahamas

The sponge beds in Bahamian waters which have been closed for the past several years were opened by Governmental decree on October 20, 1946, according to the Quarterly Economic Report of the American Consulate, Nassau, N. P., Bahamas. The disease which attacked the sponge beds and caused them to be closed has practically disappeared, but in some localities some small disease is still evidenced. Generally, the beds now being fished show an improved growth as compared with the pre-disease period.

The so-called mud beds, said to produce the best sponges, have not as yet been fished owing to the lack of boats and other equipment needed for this particular area. These mud beds, called the backbone of sponge beds, are located in the vicinity of Andros Island and cover an area approximately 100 miles in length by 80 miles in width and are in deep water.

Present fishing is being done in shallow water. If and when the mud beds are opened, thoroughly explored and found to be free of the disease, it should prove a great boon to this colony. Such fishing as has been commenced is being done on a small scale by native farmers who fish only part of the time.

Sponges so far put on the market are wool, reef, grass, and hardhead. No velvet or yellow varieties (the growth of the mud bed) have as yet been fished.

The Secretary of Agricultural and Marine Products Board stated that to date sales in the amount of \$12,000 have been made.

The writer took occasion to visit the sponge shed of one of the largest exporters of sponges in the colony where sponges were being sorted preparatory for shipment. Some 20 sorters and clippers were employed. The stock appeared to be healthy, and was made up of wool, reef, grass, and hardhead varieties, of which the wool and reef sponges were more abundant. In this shipper's shed, there were said to be \$56,000 worth of sponges ready for export from this market.



Canada

COLD STORAGE: Canadian holdings of fishery products totaled 27,417,000 pounds on March 1, according to a preliminary report received from the Department of Trade and Commerce, Dominion Bureau of Statistics. Compared with stocks held on February 1, this was a decline of 5,069,000 pounds, but was 9,218,000 pounds greater than stocks on March 1, 1946.



China

DAIREN: Emphasis is still being placed on fish production in the Dairen area, according to the American Consulate General at Dairen, China, which reports the following excerpts from local publications.

On January 15, 1947, there was published an article entitled "Helping Fishing Production," which reported that the Port Arthur-Dairen United Political Administration will extend loans of fishing equipment to the fishermen at market prices. The equipment may be obtained at once although the terms of the loan are not yet determined. The article further stated that the fishing industry must be developed to a degree far greater than under the Japanese occupation. On January 16, 1947, the local newspaper contained an article concerning an order of the Dairen Hsein Government. A fishing net factory is to be established, with the assistance of the Soviet military authorities, under the name of Yu Li Fish Net Manufacturer. When the factory is in full operation, it will employ 3,000 workmen. In the January 17, 1947, issue there was an item on the Sino-Soviet Fishing Company (subsidiary of the Soviet Fishing Trade Mission to Dairen). It stated that the company now has 30 fishing boats and that they are catching twice the quantity of fish caught by the same boats under the Japanese. An article in the February 10, 1947, issue stated that the fishermen in the Sino-Soviet Fishing Company receive an equal share in the profits and the employees of the concern receive a distribution of fish at very low prices.

Great Britain

BRITISH WHALING ACTIVITIES: Reports from the British Antarctic whaling fleet, recently released by British authorities, forecast a very successful catch this season. The factory ship *Balaena* has already taken 139,450 barrels of sperm and whale oil and it is estimated that the total catch of all ships may reach 900,000 barrels by April 7; whereas, the total catch last year--admittedly poor--was only 270,000 barrels. The value of this catch might reach \$42,000,000 with edible oil valued at \$270 per ton and sperm oil (used for highest grade lubricants) at \$320-\$450 per ton. Three factors were stated responsible for the good season:



1. Unusually good weather
2. Prevalence of blue whales which are richer in oil than the fin whales
3. Valuable "spotting" done by Walrus airplanes

Whale oil will be used largely in the United Kingdom for margarine and cooking fats rather than soap.



Iceland

ECONOMIC DEVELOPMENTS: Iceland fishing matters occupied an important part of a summary of recent economic developments in Iceland, received from the American Legation at Reykjavik.

Iced fresh fish sales to Great Britain were maintained at high levels throughout January and February. About 15,000 metric tons of fresh fish were unloaded at British ports in these two months at an average price of 0.50 crown (7.7¢) per pound.

Three thousand five hundred metric tons of herring were caught in Reykjavik's harbor waters during the first 2 months of this year. All of it was sent to Siglufjörð on the north coast for reduction into valuable herring oil and meal.

The one year trade agreement between Iceland and Czechoslovakia due to expire on February 28 was prolonged for another 2 months pending the negotiation of another agreement. Under the original one, the Czechoslovaks have been buying, on a clearing basis, small quantities of Icelandic fish products, wool and sheepskins. The Icelanders have in turn been purchasing Czechoslovakian manufactured foods. The balance of trade between the countries has been highly favorable to Iceland because of lesser Icelandic purchases attributed to high prices in Czechoslovakia. The Icelandic Government hopes to find a way to reduce its clearing balance with that country before talks commence on the new agreement.

Icelandic trade delegations are currently negotiating fish sales agreements with the British and Soviet Governments in London and Moscow.



India

EFFORTS TO IMPROVE FISHING INDUSTRY: The Government of Bombay has devised a number of plans for the improvement of the fishing industry, according to in-



formation supplied by the American Consulate General at Bombay, India. It has established a technological laboratory in Bombay at a cost of Rs. 50,000 (\$15,000)^{1/} and it has appropriated \$140,400 for the opening of an aquarium with research facilities in Bombay and two research stations on the coast, one at Ratnagiri and the other at Karwar. Further expenditures will be required next year as the collective cost is estimated to be \$210,000.

The Government has been experimenting also in improved construction of fishing vessels, calculated to increase their range and improve their storage capacity. Two deckless vessels, 45 feet long with arrangements for fish storage are under construction. Thirty such vessels, costing \$240,000 in all, are to be built in the next five years and are to be made available at as many fishing centers as possible on a subsidy-with-loan basis. The Central Government and the Government of Bombay, sharing expenses equally, have also financed experimentation with a 52-foot vessel manned entirely by members of the fishing community and equipped with a 160 horsepower engine. A second trawler has been ordered from England for the use of the deep-sea-fishing plan which was inaugurated some time ago in Bombay.

Additional cold-storage facilities are to be built in Bombay and two large fishing centers along the coast are to be erected. Toward this end the current year's budget has provided \$60,000 as a subsidy. One hundred and fifty-nine thousand dollars has been appropriated for the improvement of fish curing along the coast.

Training in the fishing industry is to be promoted by the establishment, by the Government, of a fish farm at Khopoli, where apprentices from the fishing community are to receive Government training. Nine thousand dollars has been set aside for the training of two science graduates who are to be sent abroad for training in technological problems connected with fishing. The Bombay Government will also submit the names of four candidates to the Central Government which plans to send youths to Grimsby, England, for training.

Finally, it is planned to grant larger loans at cheaper rates of interest to fishermen with boats and nets as security instead of property.



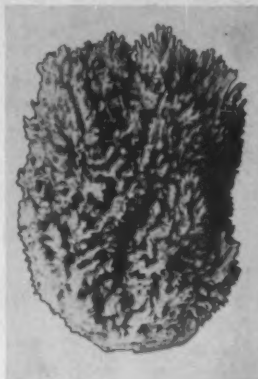
Lebanon

The outlook for the immediate future in the Syro-Lebanese sponge industry is not very promising, according to the American Legation in Lebanon. No large organizations engage in this business and individual divers have no means for acquiring modern equipment for sponge fishing.

^{1/}Indian Rupee equivalent to approximately 30 cents in U. S. currency.

Sponge beds are found along the Lebanese and Syrian coasts, between Nakoura (Lebanon) in the South and Tartous (Syria) in the North, as well as along the coasts of the Islands of Irwad and Cyprus. Summer and fall are the best seasons for sponge fishing. Local divers go out to sea in small fishingboats and dive in search of sponges without any equipment except iron nippers.

It is estimated that annual production in normal years amounts to between 2,200 pounds and 3,300 pounds. During the last few years, however, production has been very low due to wartime restrictions and to the absence of skilled divers and equipment. It has been estimated that annual production may be increased to 6,600 pounds and even to 11,000 pounds if present sponge methods are improved and modernized. Three kinds of sponges are produced: soft, medium, and coarse. About half the production is reported to be of the soft and medium varieties.



Newfoundland

MARKETING SYSTEM CONTINUED: The Newfoundland Fisheries Board has recently announced that the Newfoundland salt codfish industry will continue to market salted fish under the system which was developed during the war years and which is known as the Marketing Administration System, according to the American Consulate General, St. John's, Newfoundland.

From the early 1920's, the Newfoundland salt codfish trade in common with that of many other countries in the world, experienced a lengthy period of depression. Not only were conditions in the consuming markets bad, but it was common for exporters, in their efforts to dispose of the catch, to compete unnecessarily in making sales, to the detriment of prices. Arising from this, it became evident that some form of control was essential to the attainment of any degree of stability.

The first step in this direction was the passing of an Act in 1933 under which the Salt Codfish Exportation Board came into being. This was followed in May 1935 by the creation of the Salt Codfish Board. This Board covered only the salt codfish industry and it was apparent that its functions should be enlarged. Consequently, an Act was passed on May 24, 1936, setting up the Newfoundland Fisheries Board, with wide powers over all branches of the fishing industry.

Under the powers conferred upon the Board, under the Act, wide control was exercised over the marketing of salt codfish. This control took the form of prevention of sales on other than an outright basis and provided that such sales could be effected only on terms and at prices set by the Board from time to time. To assist the Board in establishing these conditions of sale and prices, various Advisory Committees were appointed.

One of the first steps taken by the Board was the licensing of all exporters of salt codfish and these licensed exporters formed a trade group known as the Salt Codfish Association.

Portugal was the first market to be fully controlled and the results were so beneficial to the trade that this form of control was gradually extended to cover every important market to which Newfoundland exported salt codfish. A natural development of this system of control was the formation, under the encouragement of the Newfoundland Fisheries Board, of exporters into cooperative marketing groups, such groups being given the sole right to make sales to the respective markets. The Portugal Exporters Group, Ltd., was formed in 1936 and during the period up to 1943, the group marketing system was operating for Puerto Rico, Jamaica, Spain, Brazil, and in a small measure, for several other markets. The appointment by the Board of resident representatives in Portugal, Greece, Puerto Rico, and Jamaica further assisted in improving marketing conditions.

Early in 1943, a most important and far-reaching development took place in connection with marketing. This was, briefly, Newfoundland's participation in an arrangement covering the distribution of the 1943 production of salt fish of Newfoundland, Canada, Iceland, Greenland, St. Pierre and Miquelon among allied nations and friendly neutrals under an allocation scheme controlled by the Combined Food Board, the body set up by the United Nations to facilitate procurement and distribution of those food commodities the supply of which was short. A scale of prices was laid down for all markets of the various qualities produced and allocations set, on a percentage basis, for all purchasing countries. As a result of the Combined Food Board arrangements, it was possible to establish prices to be paid to fishermen before the opening of the fishing season.

On March 25, 1947, the Newfoundland Fisheries Board, in view of the abandonment of the international marketing arrangement instituted by the Combined Food Board,¹ made the following statement, announcing the continuance of the Marketing Administration System:

Notice of Newfoundland Fisheries Board

"Notice has been received that the arrangements which have existed since 1943, by which World production of salted codfish, haddock, hake, cusk, pollock, and ling was distributed to consuming countries by the Combined Food Board and latterly by the International Emergency Food Council, will not be continued to cover fish of 1947 production. However, improvement and unification of the Group Marketing System have been under intensive study for some time, and meetings of the whole Trade are planned in the near future to discuss proposals to this effect. In the meantime important forward sales of 1947 fish can be negotiated. In view of these things and with the approval of a substantial majority of active exporters it has been decided that it would be beneficial to the Newfoundland salt codfish industry to continue, until further notice, to market Newfoundland salted fish under the system which was developed during the war years and which is known as the Marketing Administration System. To facilitate the operation of these arrangements, a Committee, as was the case last year, has been set up by the Board and denominated "The 1947 Marketing Administration Committee." The following Notice, therefore, is given to licensed exporters:



¹/The Combined Food Board was discontinued in 1946, and certain of its functions passed to the International Emergency Food Council.

"Under and by virtue of the powers conferred by Section 7 of the Newfoundland Fisheries Board Act 1936, as amended, and of the Regulations made thereunder dated the 14th day of August, A. D. 1942, The Board hereby gives notice to all licensed exporters that:

- (1) All licensed exporters are hereby required to participate in the said Group Marketing System to the full extent of their collection of fish of 1947 production of the types referred to above.
- (2) All licensed exporters are required to carry out the instructions given them from time to time by the Board, or by the Marketing Administration Committee with respect to declaration of stocks, preparation, packing, marking, and exporting, and all other matters connected with the sale for export of fish of 1947 production.
- (3) No licensed exporter shall make sales, for export, of fish of the types referred to herein. All sales shall be made by or through marketing groups on whom the exclusive right to sell and export will be conferred by the Board."



Nova Scotia

FISHERIES: The production of the Nova Scotia fisheries for February 1947 was 1,312,900 pounds of fish with a landed value of \$117,681, according to the American Consulate General, Halifax, Nova Scotia. This is a decrease of 8,619,200 pounds, and \$361,493 in value from the catch of February 1946. This decline is due, in part, to labor disputes which have tied up the deep-sea fishing fleet since December 29, 1946.

The discontinuance of import permit requirements for shipments of salt fish destined to the United States was greeted enthusiastically by Nova Scotia exporters of that product. They state that the removal of this restriction will allow them to relieve the present oversupply by direct shipment from warehouse stocks. This will obviate the necessity of drying the fish and shipping it to the West Indies, the principal previous market outlet for this product.

The economic consequences of the labor dispute referred to above cannot yet be estimated. January and February landings of cod, haddock, halibut, and pollock fell 11,948,500 pounds and \$619,523 from the same period in 1946. Approximately 500 fishermen and 1,000 fish handlers have been unemployed, principally in Halifax and Lunenburg. Small business firms in both places, dependent upon the trade of these people, have been seriously affected. Announcement was made on March 20, 1947, that work stoppage was over.

Salt fish stocks are heavy with demand light. Pickled fish stocks are low, with demand light. Fresh fish stocks are very low with moderate demand. Cold-storage stocks are heavy with fish bought at high prices. The recent drop in the Boston market has caused the owners to hold their shipments until prices have become more stable.

The Canadian Department of Fisheries has announced a new plan for the re-organization of the Fisheries Field Service. Since 65 of 100 newly appointed inspectors are to be assigned to Maritime waters to assist fishermen, it appears that the Nova Scotia industry will receive some benefits. The new appointees, all veterans of World War II, who have received special training for this purpose, will teach the fishermen modern methods of fishing, and of handling and processing the catch. The Department of Fisheries believes that this program will both increase the catch and improve the quality standards of production above present levels.

FEDERAL LEGISLATION DECISIONS, ORDERS, ETC.

Department of Agriculture

REMOVES IMPORT CONTROLS ON CANNED FISH: The removal of all import controls on canned fish was announced on April 1 by the Department of Agriculture. This action, taken under War Food Order 63, is effective immediately.

Department officials said that the need for import restrictions on canned fish no longer exists since the International Emergency Food Council has discontinued its recommendations as to world allocations of these food products.

Canned tuna fish, salmon, sardines, and herring are among the types of canned fish released from import controls by this action. A number of other types of pickled, salted, and canned fish had already been removed from WFO-63 by earlier action.



Civilian Production Administration

FIBERS: Use and distribution controls over sisal (agave) tow, No. 2 grade, and maguey fiber, have been dropped by amendment of Conservation Order M-84, the Civilian Production Administration announced on March 24, 1947.

This action was taken because the quality of these fibers being received in the United States was not suitable for the products permitted under the order, which included rope, binder and baler twine and some fish twine.

The amendment also provides that fishing twines hereafter may be made only from manila. Action was due to the decrease in receipts of agave fiber, use of which previously was permitted in making fishing twines.

Reporting requirements of M-84 were clarified by providing that fiber which has been invoiced to a purchaser for the end of a calendar month should be included in his report rather than the seller's report. The amendment also states that the use of 10 percent cordage lubricant is not required in lariat rope.

The inventory limit on manila (abaca) fibers of 90 days' supply was raised to 150 days. Inventory controls on rope and twine, previously imposed by CPA's Priorities Regulation 32, were incorporated in Order M-84 by the amendment.

After March 24, non-spinnable manila fiber held by the Reconstruction Finance Corporation will not be allocated by CPA. Applications for such fiber should be made direct to RFC.

* * * * *

MANILA FOR FISH NETS: The Civilian Production Administration amended M-84 (Manila, and Agave Fiber and Cordage) on March 25, 1947, and changed the authorization from sisal to manila for the making of hanging and heading twine, marline (lobster) and net twine for otter trawls.

The shortage of sisal fiber has made it necessary that the use of sisal for fishing twines be discontinued.



War Assets Administration

SURPLUS FOOD DISPOSAL: Responsibility for disposal of surplus agricultural commodities and foods will be transferred from the Department of Agriculture to War Assets Administration on May 1, WAA announced on April 10.

In a recent letter to Agriculture, WAA Administrator Robert M. Littlejohn, said: "This Administration is agreeable to taking over the disposal of surplus agricultural commodities and foods as of May 1, with the understanding that the Department of Agriculture will dispose of its present inventories and items covered by declarations made by owning agencies through April 30 and, if possible, conclude all such disposal operations by June 30."



DDT TESTS

In 1946, investigations of DDT damage to fish and wildlife were continued in two areas where observations were made in 1945 and were extended to new localities in six different States. Fair to successful control of ticks, insects, and barnacles was effected.

DDT was applied in most instances by airplane, as an oil spray, at rates under 1.1 pound per acre. The maximum rate in the field was 5 pounds per acre. A single application was the rule in all but two areas. In one of these there were four at weekly intervals, in the other there were two with a four-weeks' interval. Spectrophotometric analyses in two areas indicated that only a small fraction of the DDT distributed was deposited on the ground.

Amphibians were affected by an application at the rate of 3 pounds per acre. Nearly all of a fiddler crab population was killed by 2 pounds of DDT per acre. Oysters were practically uninjured, while barnacle growth was inhibited by concentrations up to 5 pounds per acre.

In laboratory and hatchery pond experiments, varying susceptibility of different species of fishes to DDT poisoning was indicated; although under similar conditions smallmouth bass were one time less, another time more, affected than were largemouth bass.

DDT in suspension killed about as many fish as did DDT in oil, at the same concentration. For some species, under some conditions, mortality was high at concentrations of DDT as low as 0.25 pound per acre. Mortality was less in aquaria containing some mud than in those without, apparently due to inactivation of DDT by the mud. It was less in ponds where the fish were fed than in those where they were not fed; therefore, the physical condition of the fish appeared to be a factor in their survival. Young fish were more susceptible to DDT poisoning than were adults.

--Special Scientific Report No. 41

RECENT FISHERY PUBLICATIONS

Listed below are informational publications which recently have been processed by the Division of Commercial Fisheries. FL publications are available, free of charge, from the Fish and Wildlife Service, Merchandise Mart, Chicago 54, Ill. Other listed publications may be obtained, also free of charge, from the Division of Commercial Fisheries, Fish and Wildlife Service, Washington 25, D. C.

Number	Title
CFS-318	- Frozen Fish Report, 1946 - Annual Summary
CFS-319	- New England Landings, December 1946
CFS-322	- Frozen Fish Report, February 1947
CFS-325	- Maine Landings, December 1946
CFS-327	- Meal and Oil Report, January 1947
CFS-328	- Frozen Fish Report, March 1947
CFS-329	- Maine Landings, January 1947
FL-195 (Revised)	- Partial List of Manufacturers of Fishing Gear and Accessories
FL-202	- Pacific Salmon-Succulent and Savory
FL-215	- Outlook for Production, Distribution and Marketing in the Fisheries and Related Industries in 1947
FL-219	- Recipes Used in the Fish Cookery Demonstrations, South Atlantic States
SL-3 (Revised)	- Wholesale Dealers in Fishery Products, Massachusetts, 1946
SL-101 (Revised)	- Firms Canning Salmon, 1946
SL-103 (Revised)	- Firms Canning Tuna and Tunalike Fishes, 1945
SL-151 (Revised)	- Firms Manufacturing Fish Meal, Scrap, Oils, etc., 1945
SL-153 (Revised)	- Firms Manufacturing Fish Glue and Isinglass, 1945
SL-154 (Revised)	- Firms Manufacturing Seaweed Products, 1945
SL-155 (Revised)	- Firms Manufacturing Marine Shell Buttons, 1945
SL-156 (Revised)	- Firms Manufacturing Pearl Essence, 1945
SL-157 (Revised)	- Firms Manufacturing Fish-Liver Oils, 1945
MDL-51	- Officials of Refrigerated Locker Plant Associations, State and National
MDL-52	- State School Lunch Supervisors

Reprint (Separate) from Commercial Fisheries Review.

Sep. No. 168 - Fishery Programs in the U.S.S.R.

Designations for fishery publications are interpreted as follows:

CFS - Current fishery statistics of the United States and Alaska.

SL - Statistical lists, consisting of lists of dealers of fishery products and manufacturers of byproducts.

FL - Fishery leaflets.

MDL-- Market development lists of frozen food locker plants and locker associations.



Editorial Assistant -- Bessie B. Johnston
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Composers -- Jean Zalevsky and Norma C. Dressler
Processing -- Miscellaneous Service Division

FLOW CHART OF THE COMMERCIAL FISHERIES-1946

**NET WEIGHT OF
COMMODITIES
MARKETED**

808.920,000
• LBS. USED

**MARKETED
FRESH**

808,920,000 LBS.

CATCH:

635,000,000
LBS. USED

FILLETS (FRESH AND FROZEN)

210,000,000 LBS.

FROZEN (NOT FILLETS)

10

44

173,275,000 LBS.
80,000,000 LBS.

↑CURED

BILLION

**1,220,000,000
LBS. USED**

CANNED

657,000,000 LBS.

POUNDS

1,410,000.000
LBS. USED

600,000,000 POUNDS
OF WASTE USED

BY-PRODUCTS

MEAL
382,000,000 LBS.

OIL
152,000,000 LBS.

THE VENEZUELAN SALT-FISH INDUSTRIES



The Venezuelan Salt-Fish Industries--Fishery Leaflet 240--is a report of a mission detailed to Venezuela late in 1943. It consists of two parts, three appendices, and a supplement. Part I describes the present condition of the salt-fish industries. Part II discusses the potential productive capacity of the Venezuelan fisheries (a) using existing facilities and methods and supplying only necessities for maintenance and organization, and (b) with overall organization, gradual modernization of existing facilities and methods, development of new fishing areas, and the addition of new facilities and producing methods. The appendices cover the common names of fish in Spanish and English, a glossary of terms used in the fishing industry, and a tabulation of exchange rates, weights, and measures. The supplement to the report describes studies on the control of "reddening" in salt-fish products.

Fishery Leaflet 240 may be obtained upon request, without charge, from the Fish and Wildlife Service, Merchandise Mart, Chicago 54, Ill.

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